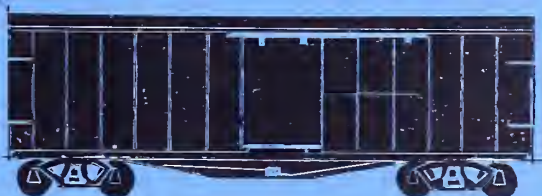
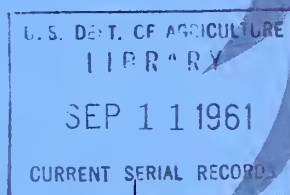


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GRAIN TRANSPORTATION in the NORTH CENTRAL REGION



AN ECONOMIC ANALYSIS

U. S. DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
TRANSPORTATION AND FACILITIES
RESEARCH DIVISION

PREFACE

This study of the changing patterns of grain transportation in the North Central Region is part of a broad program of research by the Agricultural Marketing Service, U. S. Department of Agriculture, to improve the marketing of agricultural products.

There is much interest among grain producers, carriers, country and terminal elevator operators, markets, and other groups in the extent that and the reasons why other modes of transport are participating in the movement of grain that for many years was almost exclusively handled by the railroads.

This report analyzes grain transportation for recent years within and from the North Central Region, embracing the States of North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Illinois, Indiana, Michigan, and Ohio.

ACKNOWLEDGMENTS

This study was made possible through the cooperation of shippers, carriers, grain exchanges, boards of trade, trade associations, and research groups in the land-grant colleges of the North Central Region, who gave freely of their time and provided the information for the study. Basic country elevator data for the study were obtained through the Commodity Stabilization Service of the Department by Agricultural Stabilization Committees in the sample counties. The Freight Rate Service Branch of the Agricultural Marketing Service furnished invaluable assistance in the analysis of grain transportation developments since 1958.

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SUMMARY

Grain transportation in the North Central Region is changing. From the Great Plains States of North Dakota, South Dakota, Kansas, and Nebraska, eastward through Minnesota, Iowa, Missouri, Illinois, Indiana, Michigan, and Ohio, the historic, nearly exclusive area for the railroads is being challenged by motortruck and, where available, barges and other vessels.

Although practically all of the Government-owned grain moves by rail to gain flexibility in storage location, movements of Government-owned grain in the North Central Region in 1958 accounted for only 15 percent of the grain shipments from country elevators and only 25 percent of the volume from terminal elevators.

Of all nongovernment grain shipments from country elevators in 1958, the railroads carried 69 percent, trucks 30 percent, and barges 1 percent. Although the total volume to all markets in the region rose 8 percent from 1954 to 1958, truck shipments jumped 95 percent while rail volume dropped 6 percent.

During the 5-year period 1954-58, the railroads' share of nongovernment, or "free," grain moving overland from country elevators declined significantly.

Trucks made their biggest impact in the movement of coarse grains, primarily corn and oats. Railroads continued to carry the lion's share of the wheat, barley, and sorghums for grain. For movements within the region, truck transportation of nongovernment corn and oats from country elevators west of the Mississippi River decreased in the 1956-58 period. The trucks' share of this traffic increased east of the Mississippi River.

To destinations outside the North Central Region, railroads generally have improved their relative position in grain traffic to the West and from the eastern and western areas of the North Central Region to the Southwest. To eastern and southeastern destinations, the railroads' share has declined, as has their share of shipments to the Southwest from the central areas of the region.

Rail grain rates have doubled since World War II. Country elevator operators, responding to the question about their reasons for increased use of trucks, indicated the shift resulted from these increased rail rates and from service factors, with somewhat more emphasis on the freight rate increases.

Trucks owned or leased by elevators or processors were the principal type of trucks used in 1958 to carry grain from the country elevators to processors. For-hire trucks were the primary movers of grain trucked to terminals. The merchant trucker predominated in movements to feeding areas.

From terminal elevators, the rail share of total grain shipments dropped from 69 percent in 1954 to 64 percent in 1958. Movements by truck increased from about 1 to 2 percent. The water carriers' share increased from 31 to 34 percent, indicating the major importance of the inland rivers and the Great Lakes for grain transportation.

The major criticisms of rail service by the terminal elevators were the frequent shortages of rail cars and the high level of rates. About 36 percent of the terminal elevators reported a decline since World War II in the share of grain shipped by rail, but the railroads still were the primary carrier. The principal reasons were the availability of rail transit privileges and the fact that elevator facilities were designed primarily for receiving and shipping grain by rail.

Reduced rail rates in 1958 resulted in greater proportions of total grain traffic moving by rail from 36 percent of the country elevators affected by the reductions and from 7 percent of the terminals.

The opening of the St. Lawrence Seaway in April 1959 further stimulated railroad efforts to meet truck and water competition; the railroads made numerous selective reductions in rates in 1959 and 1960. Significant quantities of grain moved through the Great Lakes-St. Lawrence Seaway route for export in 1959, and the volume increased in 1960.

GRAIN TRANSPORTATION IN THE NORTH CENTRAL REGION

AN ECONOMIC ANALYSIS

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INTRODUCTION

The movement of grain to markets and mills by motortruck and water has been steadily increasing. Historically, the marketing of grain has been by railroad and the growth of the new methods, accompanied by the development of new merchandising practices and patterns of flow, are of concern to many merchandisers and users of grain.

This study is an analysis of grain transportation data published in Statistical Bulletin No. 268, "Grain Transportation Statistics for the North Central Region," covering grain transportation in calendar year 1958 (17)¹. This information is supplemented by statistical data published by the U.S. Corps of Engineers, grain exchanges, port authorities, and boards of trade, and by grain movement information developed and published by the several colleges in the North Central Region, as well as other statistical data published by the U.S. Department of Agriculture.

Using this information, the study analyzes the movement of Government and nongovernment corn, soybeans, wheat, oats, barley, and sorghums by mode of transport from country elevators in the North Central Region to markets of first destination, both within and outside the North Central Region, and from terminal elevators in the North Central Region by mode of transport.

The possible influences of changing production patterns and domestic and export demand for grain, available transportation facilities and equipment, and carrier rates and services on the transportation of grain are analyzed to provide a composite and comprehensive picture of just what is taking place and where it is taking place.

The 1958 primary data covering grain shipments by country elevators are presented for 20 geographical areas within the 11 States covered by the grain transportation survey (fig. 1) (17). Any finer division could have resulted in disclosure of individual company policies or operations. The following factors were considered in defining these areas: Historical pattern of grain traffic flow, available rail lines and commercially navigable waterways, locations of feeding and grain deficit areas, and grain production data. The statistical data for country elevators for 1958 are based on information from 1,605 elevators. Each elevator had an annual volume of over 10,000 bushels, over 50 percent of the grain handled was received directly from farmers, and the elevator's primary business function was merchandising raw grain.

Terminal elevators were defined as those using official weights and grades, primarily engaged in merchandising raw grain, and receiving most of their grain from country elevators. The primary terminal elevator data for 1958 are based on information submitted by 93 elevators, including some subterminal facilities owned or operated by major terminal concerns. Most of the subterminal facilities included in the study are located on the inland waterways and facilitate the movement of grain from country elevators to terminals.

¹ Underlined figures in parentheses refer to items in References, page 111.

To facilitate the analysis and reveal grain transportation patterns, the terminal elevator data were analyzed for eight major geographic groups or market areas (fig. 2). These groups were based on the locations of the sampled elevators and on the types of transportation available for the movement of grain.

For methods used in expanding the basic data, see Statistical Bulletin No. 268 (17), referred to above.

GRAIN PRODUCTION: UNITED STATES AND NORTH CENTRAL REGION

Transportation is the link between producer and consumer. In 1959, the 11 States of the North Central Region included in this study accounted for 67 percent of the total United States production of corn, soybeans, wheat, oats, barley, and sorghums for grain (table 1). Because of inadequate response, Wisconsin is not included in the North Central Region as defined in this study (17, p. 13). Production in the 11 State area increased 24 percent from 1954 to 1959, and 1958 production was 27 percent above 1954. The 11 States grew 76 percent of United States corn produced in 1959, 75 percent of the soybeans, 53 percent of the wheat, 67 percent of the oats, 37 percent of the barley, and 41 percent of the sorghums for grain.

Production depends largely on acreage allotments, weather conditions, and economic factors beyond the scope of this study. For a detailed breakdown of production by commodities, see table 1 of Statistical Bulletin No. 268 (17).

From the farms where the grain is produced, it usually is transported by trucks to country elevators where it is conditioned, stored, and eventually merchandised. The country elevator is the doorway through which the grain moves into consuming channels.

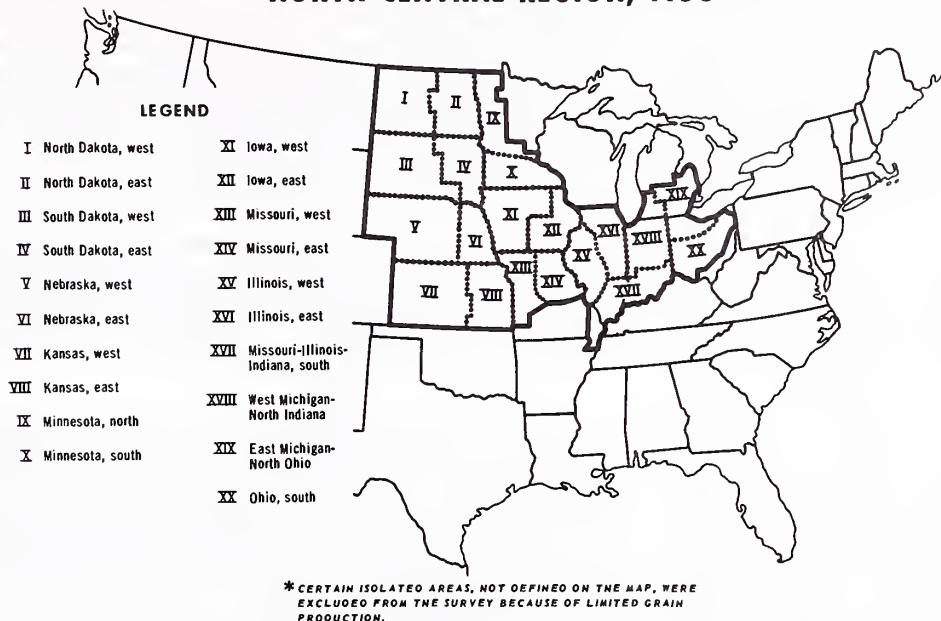
TABLE 1.--Production of selected grains in States of the North Central Region and total U.S. production, 1954-59¹

| State | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 |
|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> |
| Illinois..... | 740,882 | 847,806 | 934,841 | 790,481 | 920,581 | 933,594 |
| Indiana..... | 410,333 | 423,794 | 440,287 | 384,669 | 434,219 | 453,709 |
| Iowa..... | 855,648 | 829,859 | 744,227 | 946,215 | 982,622 | 1,069,490 |
| Kansas..... | 317,575 | 242,695 | 236,338 | 320,310 | 539,321 | 481,523 |
| Michigan..... | 172,189 | 184,724 | 175,458 | 168,939 | 212,055 | 203,487 |
| Minnesota..... | 534,872 | 567,791 | 595,321 | 586,083 | 634,152 | 598,403 |
| Missouri..... | 213,667 | 312,966 | 334,661 | 293,417 | 339,008 | 369,283 |
| Nebraska..... | 344,722 | 252,043 | 213,624 | 444,610 | 543,935 | 502,465 |
| North Dakota..... | 212,058 | 278,256 | 275,827 | 294,812 | 362,003 | 237,800 |
| Ohio..... | 355,473 | 361,662 | 337,723 | 291,823 | 346,603 | 369,041 |
| South Dakota..... | 264,875 | 226,483 | 180,020 | 302,537 | 307,077 | 150,123 |
| Total..... | 4,422,294 | 4,528,079 | 4,468,327 | 4,823,896 | 5,621,576 | 5,368,918 |
| United States..... | 6,407,016 | 6,684,821 | 6,655,239 | 7,159,156 | 8,343,432 | 8,014,869 |

¹ Selected grains include corn, soybeans, wheat, oats, barley and sorghums for grain.

Agricultural Statistics, 1956-1959, U.S. Dept. Agr. (66); Crop Production, Annual Summary, 1959 and 1960, Crop Reporting Board, AMS, U.S. Dept. Agr. (64).

GRAIN TRAFFIC AREAS USED IN SURVEY OF COUNTRY ELEVATORS, NORTH CENTRAL REGION, 1958*



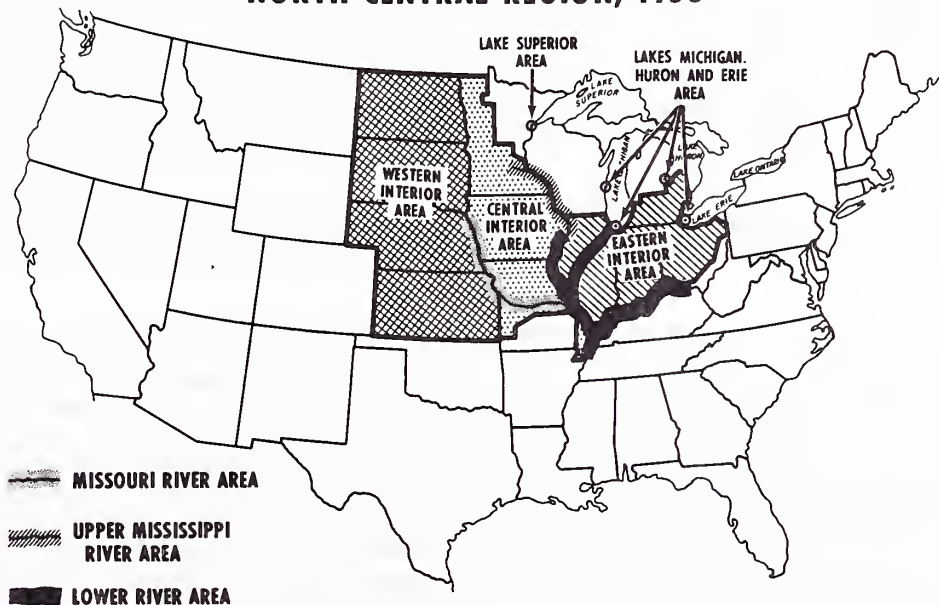
U. S. DEPARTMENT OF AGRICULTURE

NEG. 7592-59 (12)

AGRICULTURAL MARKETING SERVICE

Figure 1

GRAIN MARKET AREAS USED IN SURVEY OF TERMINAL ELEVATORS, NORTH CENTRAL REGION, 1958



U. S. DEPARTMENT OF AGRICULTURE

NEG. 7593-61 (1)

AGRICULTURAL MARKETING SERVICE

Figure 2

COUNTRY ELEVATOR GRAIN TRANSPORTATION

Storage Capacities and Facilities for Handling Grain

The grain transportation survey indicated that, as of October 1957, the grain storage capacity of all country elevators in the 11 States of the North Central Region was about 983 million bushels (17). Space for an additional 319 million bushels was reported as constructed during 1958, for a 32-percent increase to an overall capacity of 1.3 billion bushels. With the forecast of additional capacity to be built before the 1959 harvest, the storage capacity of country elevators in the North Central Region was expected to reach 1.5 billion bushels by September 1959, a further increase of 15 percent.

The heaviest concentration of grain storage facilities is found in Nebraska, Kansas, western Iowa, and eastern Illinois. The capacity of these areas was 57 percent of the regional total in October 1957. In their efforts to meet the growing demand for grain storage in interior mills, elevators, and warehouses, these areas added storage capacity amounting to 71 percent of the total added in the North Central Region during the period October 1957-September 1958.

Interior storage, other than on farms, is becoming relatively more important in terms of the total volume of grain stored (table 2). The storage of grain on farms appears to be decreasing in importance; over 53 percent of United States grain stocks were stored on farms on January 1, 1960, in contrast to an average of just over 66 percent for the 1949-58 period. For the 10 years 1949-58, average United States grain stocks as of January 1 were 5.6 billion bushels (63), of which about 18 percent was stored at interior mills, country elevators, and warehouses. During the next year most of the additional capacity previously discussed was provided in the North Central Region, U. S. grain stocks grew by almost 50 percent, and the amount stored at interior mills, country elevators, and warehouses more than doubled. As of January 1, 1959, over 25 percent of the total stocks were stored at these points.

This tendency to interior storage was most pronounced for corn and wheat, the two grains most common to the areas accounting for the greater part of the additional storage. The percentage of total U. S. stocks of corn stored in interior mills, country elevators, and warehouses jumped from a 10-year average of about 6 percent to close to 15 percent as of January 1, 1960. The actual volume of corn stored at these facilities increased from a 1949-58 average of 166 million bushels to 654 million in 1960. Wheat demonstrated a similar pattern, with an average of 507 million bushels, 42 percent of the average total stock, stored at interior points during the period 1949-58. This rose to a high of 988 million bushels on January 1, 1960, almost 53 percent of the total wheat stocks on hand.

In light of this increase during 1959, it is likely that the estimated 198 million bushels of additional storage planned within the North Central Region, and possibly even more, was constructed.

In 1958, nearly all country elevators were equipped to load rail cars. Out of 1,605 elevators sampled in the North Central Region 1,558 indicated whether or not they were equipped to load certain types of trucks. About 85 percent stated that they could load open-top semitrailers; about 26 percent reported that they could also load closed-van semitrailers. No elevators using the same facilities to load both cars and trucks are included in these percentages. The ability of the country elevators to handle either of these types of semitrailers varied considerably in each of the 20 traffic areas defined for the North Central Region. The percentage of sampled elevators that indicated they were equipped to load open-top semitrailers was relatively high in all the traffic areas. Seventy percent of the elevators sampled in western North Dakota and about 96 percent of those in western Iowa were able to load this type of truck. These two traffic areas represented the extremes. In all areas except eastern Iowa, eastern Michigan-northern Ohio, eastern North Dakota, and western North Dakota, more than 80 percent but not over 96 percent of the country elevators sampled were equipped to load open-top semitrailers.

TABLE 2.--Distribution of grain stocks in United States, by position, average January 1, 1949-58; annual January 1, 1959 and 1960

| Year and position | Corn | Soy-beans | Wheat | Oats | Barley | Sorghums for grain | Total, 6 grains |
|--|---------|-----------|---------|---------|---------|--------------------|-----------------|
| | Percent | Percent | Percent | Percent | Percent | Percent | Percent |
| Average, January 1, 1949-58: | | | | | | | |
| On farms ¹ | 78.1 | 45.7 | 28.7 | 91.9 | 59.6 | 38.0 | 66.2 |
| Terminals ² | 2.3 | 6.1 | 24.5 | 2.2 | 10.8 | 15.8 | 8.0 |
| Commodity Credit Corp. ³ | 13.8 | .1 | 4.5 | .3 | .7 | .3 | 8.0 |
| Interior mills, elevators, and warehouses ^{1 4} | 5.8 | 48.1 | 42.3 | 5.6 | 28.9 | 45.9 | 17.8 |
| Total..... | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| January 1, 1959: | | | | | | | |
| On farms ¹ | 68.7 | 42.9 | 25.1 | 90.7 | 58.1 | 26.5 | 56.4 |
| Terminals ² | 2.5 | 9.1 | 23.2 | 2.4 | 12.0 | 17.9 | 9.1 |
| Commodity Credit Corp. ³ | 16.1 | .4 | 4.8 | .4 | 2.4 | .4 | 8.8 |
| Interior mills, elevators, and warehouses ^{1 4} | 12.7 | 47.6 | 46.9 | 6.5 | 27.5 | 55.2 | 25.7 |
| Total..... | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| January 1, 1960: | | | | | | | |
| On farms ¹ | 69.5 | 43.6 | 17.7 | 90.2 | 55.0 | 21.3 | 53.4 |
| Terminals ² | 3.0 | 9.9 | 25.9 | 2.3 | 10.4 | 16.9 | 9.9 |
| Commodity Credit Corp. ³ | 12.8 | .1 | 3.8 | .2 | 3.4 | .4 | 7.5 |
| Interior mills, elevators, and warehouses ^{1 4} | 14.7 | 46.4 | 52.6 | 7.3 | 31.2 | 61.4 | 29.2 |
| Total..... | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

¹ Estimates of Crop Reporting Board, U.S. Department of Agriculture.

² Commercial stocks reported by Grain Division, Agricultural Marketing Service, at 45 terminal cities.

³ Owned by Commodity Credit Corporation and stored in bins or other storages owned or controlled by CCC; other CCC-owned grain is included in the estimates by positions.

⁴ All off-farm storages not otherwise designated, including merchant mills.

Grain Market News, Weekly Summary and Statistics, Vol. 8, No. 4, January 29, 1960. Grain Division, Agr., Mktg. Serv., (63).

In contrast, the returns from sampled elevators in each area revealed they were not generally equipped to load closed-van semitrailers. At one extreme, only 5 percent of the country elevators sampled in western Kansas could load closed-van semitrailers, and at the other extreme, about 42 percent in northern Minnesota had the necessary loading facilities. As will be shown later, much of the grain moving by truck from the latter district moved by regulated common carriers as backhaul traffic for van-type trucks carrying manufactured products from the market points to country areas.

In all areas except eastern Nebraska, western and eastern Kansas, western and eastern Iowa, and western and eastern Illinois, not more than 42 percent nor less than 20 percent of the country elevators sampled could load closed-van semitrailers. This style of trailer may not be used extensively by country elevators because of the added investment required for outfitting their facilities to handle them. The open-top semitrailer

probably is more widely available, is more adaptable, performs the same service, and does not necessarily require specialized equipment to load, although its utility for the handling of other than bulk commodities on the backhaul is limited.

Sources of Grain

The motortruck was the predominant mode of transport used to move grain into country elevators in 1958. Less than 5 percent of the sampled country elevators reported any receipt of grain by rail. Any rail receipts were generally seed grain or, in some cases, feed grains not normally grown in the receiving area.

The trucked grain moved into the elevators from nearby farms. Data indicate that the average country elevator draws most of its grain from a local buying area with a radius of not more than 15 miles. Of the 1,559 elevators indicating their normal buying radius, 53 percent reported a radius of 10 miles or less. Another 24 percent stated their radius to be 11 to 15 miles. In this study, the local buying radius of a country elevator is considered to be 15 miles or less.

Elevators in Kansas, Nebraska, the Dakotas, and Minnesota tended to have the broadest buying areas. Of the 813 elevators reporting from these States, 61 percent considered their normal buying radius to be over 10 miles. On the other hand, in the more populous States east of the Missouri River only 32 percent of the 746 elevators sampled bought grain from sources more than 10 miles away. The extreme cases in each group were western North Dakota and eastern Illinois. In the former area 81 percent of the elevators stated their radius to be more than 10 miles, while only 11 percent of the elevators in eastern Illinois specified a drawing area this large.

Country elevators received most of the grain they handled from surrounding areas. Of the 1,559 elevators reporting, 55 percent stated they never received grain from outside their local buying areas. Another 40 percent indicated occasional receipts from other areas and only 5 percent frequently received grain from outside their normal buying radius.

For specific data covering grain buying patterns by areas, see tables 15 and 16 of Statistical Bulletin No. 268 (17).

Grain Volume Bypassing Country Elevators

A country elevator does not always handle the entire volume of grain sold from farms within its local buying radius. The 1958 survey indicated that a considerable volume of grain moved directly from farms to terminal and subterminal markets, processors, and feeding areas.

This bypassing movement has increased since 1955, but has not reached a point where the majority of the country elevator operators think it to be of consequence. Of the 1,499 operators responding, only 24 percent considered the volume of grain bypassing their elevator to be significant (table 3).

The degree of bypassing varied, depending upon the kind of grain, type of first destination, and availability of markets. The number of country elevators reporting significant bypassing to terminal or subterminal markets and to processors was largest in the eastern and central areas of the North Central Region. Of the 196 listed destinations of such grain shipments, 104 were in Illinois, southeastern Missouri, Indiana, Michigan, and Ohio, and 55 were located in Minnesota, Iowa, and Missouri. The proximity of outlets probably contributes to the varying degrees of bypassing.

The actual volume of grain bypassing the country elevators was not determined since much of the bypassing volume goes to feeders or processors not interviewed in this survey. On the basis of data obtained from terminal elevators of the North Central Region, it is estimated that in 1958 over 87 million bushels of grain was trucked from farms

TABLE 3.--Country elevators in North Central Region reporting that a significant volume of grain bypasses local elevators, by location of elevator, kind of grain, and type of destination, 1958

| Location of elevator and kind of grain | Country elevators reporting | Country elevators reporting that bypassing is significant | Country elevators reporting a significant volume of bypassing that went to-- | | |
|--|-----------------------------|---|--|---------------|---------------|
| | | | Terminal and sub-terminal markets | Processors | Feeding areas |
| | <u>Number</u> | <u>Number</u> | <u>Number</u> | <u>Number</u> | <u>Number</u> |
| Western areas ¹ | 646 | 96 | -- | -- | -- |
| Corn..... | -- | -- | 21 | 6 | 45 |
| Soybeans..... | -- | -- | 5 | 6 | 2 |
| Wheat..... | -- | -- | 40 | 13 | 8 |
| Oats..... | -- | -- | 19 | 6 | 19 |
| Barley..... | -- | -- | 27 | 11 | 16 |
| Sorghums for grain.... | -- | -- | 30 | 15 | 31 |
| Central areas ² | 329 | 81 | -- | -- | -- |
| Corn..... | -- | -- | 48 | 24 | 51 |
| Soybeans..... | -- | -- | 44 | 35 | 19 |
| Wheat..... | -- | -- | 33 | 12 | 15 |
| Oats..... | -- | -- | 30 | 13 | 38 |
| Barley..... | -- | -- | 12 | 7 | 14 |
| Sorghums for grain.... | -- | -- | 32 | 12 | 23 |
| Eastern areas ³ | 524 | 178 | -- | -- | -- |
| Corn..... | -- | -- | 128 | 50 | 65 |
| Soybeans..... | -- | -- | 101 | 46 | 28 |
| Wheat..... | -- | -- | 109 | 36 | 30 |
| Oats..... | -- | -- | 75 | 26 | 42 |
| Barley..... | -- | -- | 33 | 15 | 19 |
| Sorghums for grain.... | -- | -- | 13 | 8 | 9 |
| North Central Region.... | 1,499 | 355 | -- | -- | -- |
| Corn..... | -- | -- | 197 | 80 | 161 |
| Soybeans..... | -- | -- | 150 | 87 | 49 |
| Wheat..... | -- | -- | 182 | 61 | 53 |
| Oats..... | -- | -- | 124 | 45 | 99 |
| Barley..... | -- | -- | 72 | 33 | 49 |
| Sorghums for grain.... | -- | -- | 75 | 35 | 63 |

¹ North Dakota, South Dakota, Nebraska, and Kansas.

² Minnesota, Iowa, and Missouri (excluding southeastern portion).

³ Southeastern Missouri, Illinois, Indiana, southern Michigan, and Ohio.

Grain Transportation Statistics for the North Central Region, table 17 (17).

directly to the terminal points (fig. 3). This volume accounted for more than 21 percent of the total truck receipts at terminal elevators in the North Central Region and was equal to about 17 percent of the estimated truck movement from country elevators, regardless of destination.

GRAIN RECEIVED BY TRUCK AT TERMINAL ELEVATORS, NORTH CENTRAL REGION

From Farmers, Country Elevators, and Others

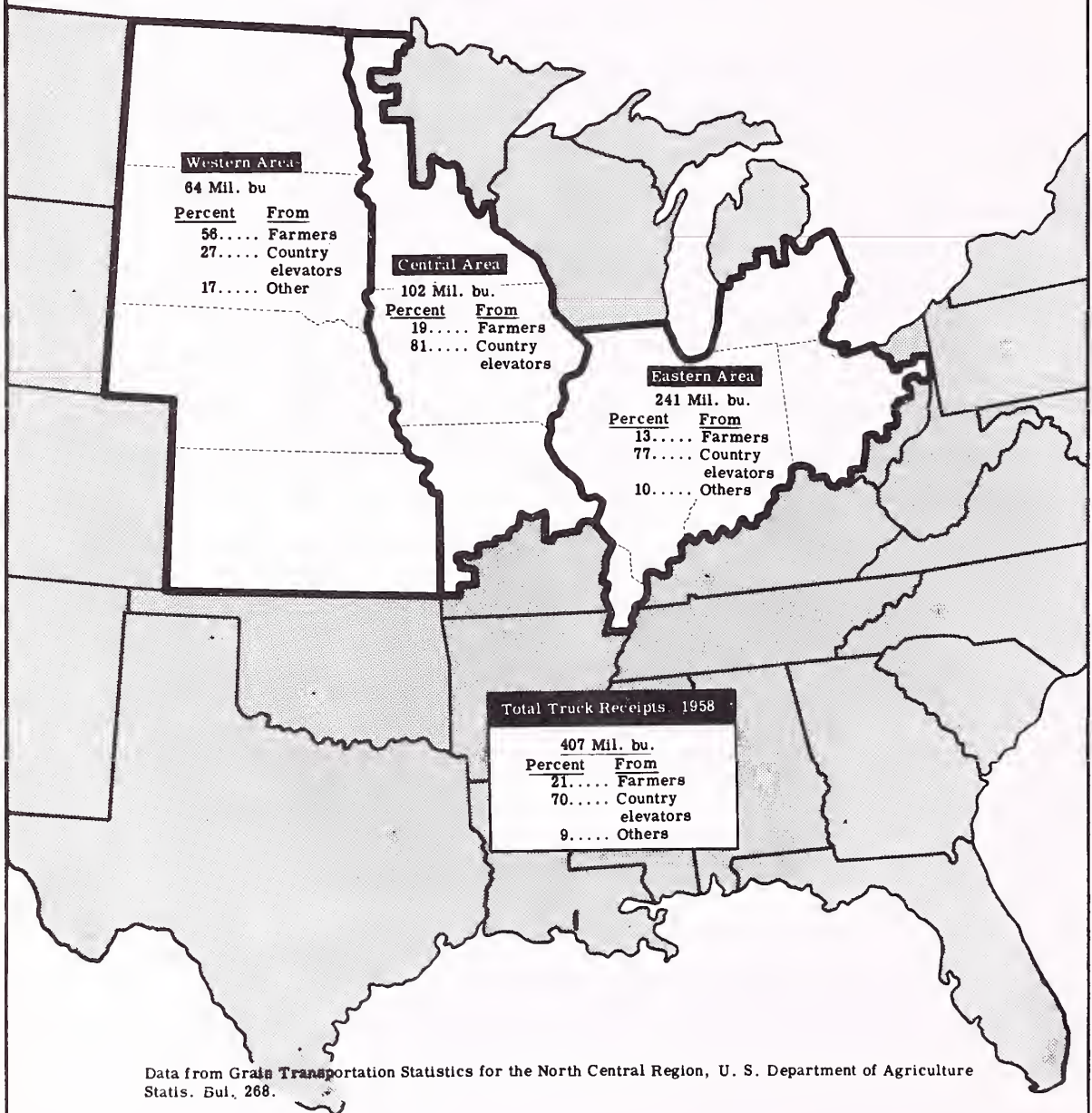


Figure 3

From the central area of the region, 25 percent of the elevators reporting stated that the volume of grain bypassing their elevators was significant.

The greater availability of terminals and processors in the eastern part of the North Central Region, together with the nearby southeastern market, is reflected in the greater amount of bypassing reported in the eastern areas. Thirty-four percent of the responding elevators in the eastern areas of the North Central Region stated that bypassing was significant.

Significant bypassing was reported by only 15 percent of the elevators in the western areas. Virtually nonexistent in the Dakotas, most of the reported bypassing was in Nebraska and Kansas.

Local Sales

During 1958, 2.4 billion bushels of grain was shipped from country elevators in the North Central Region (table 4). This outbound traffic includes local sales of 289 million bushels. Corn and oats accounted for about 86 percent of these sales; grain sorghums and wheat amounted to 9 percent; and soybean and barley sales made up about 5 percent.

TABLE 4.--Relationship of local sales to total grain shipments from country elevators in North Central Region, by area, 1958

| Area | Total shipments ¹ | Local sales | |
|--|------------------------------|--------------------|-------------------------------|
| | | Volume | Percentage of total shipments |
| | <u>Million bu.</u> | <u>Million bu.</u> | <u>Percent</u> |
| North Dakota, west..... | 74.6 | 1.9 | 2.5 |
| North Dakota, east..... | 134.9 | 5.2 | 3.9 |
| South Dakota, west..... | 28.8 | 1.5 | 5.2 |
| South Dakota, east..... | 102.2 | 18.1 | 17.7 |
| Nebraska, west..... | 73.1 | 7.5 | 10.3 |
| Nebraska, east..... | 127.5 | 24.8 | 19.5 |
| Kansas, west..... | 171.0 | 11.1 | 6.5 |
| Kansas, east..... | 102.9 | 16.0 | 15.5 |
| Minnesota, north..... | 75.4 | 6.9 | 9.2 |
| Minnesota, south..... | 169.0 | 25.7 | 15.2 |
| Iowa, west..... | 249.8 | 53.4 | 21.4 |
| Iowa, east..... | 91.6 | 23.7 | 25.9 |
| Missouri, west..... | 46.9 | 6.9 | 14.7 |
| Missouri, east..... | 37.5 | 6.2 | 16.5 |
| Illinois, west..... | 146.4 | 21.2 | 14.5 |
| Illinois, east..... | 333.4 | 15.2 | 4.6 |
| Missouri-Illinois-Indiana, south..... | 72.0 | 7.3 | 10.1 |
| Western Michigan-Northern Indiana..... | 178.7 | 20.4 | 11.4 |
| Eastern Michigan-Northern Ohio..... | 146.0 | 10.2 | 7.0 |
| Ohio, south..... | 48.4 | 5.8 | 12.0 |
| Total..... | 2,410.1 | 289.0 | 12.0 |

¹ Total shipments include Government and nongovernment grain and grain sold locally.

Grain Transportation Statistics for the North Central Region, tables 18, 20, and 21 (17).

The relationship of local sales to total shipments varies within the traffic areas developed for this study. Twelve percent of the grain moving out of country elevators in the North Central States was sold for feed and seed requirements on nearby farms. The volume of local sales depends principally on grain production, poultry and livestock feed requirements, and the demand for seed. Local sales in North Dakota were only 3.4 percent of the total grain movement from country elevators within the State. Poultry production in North Dakota is minor. In Iowa, the leading State in commercial egg and hog production and among the leaders in turkey and beef cattle production, about 23 percent of the grain from country elevators was sold locally. Local sales in the other areas reflect comparative feed grain production and poultry and livestock population.

Average Volume of Nongovernment Grain Shipments From Country Elevators, 1958

Of the approximately 8,500 country elevators in the North Central Region, it is estimated that almost 7,600 elevators used rail transportation for grain shipments in 1958 (table 5). Rail movement from these elevators totaled more than 1.2 billion bushels, or an average of 161,000 bushels per elevator using rail. An additional half billion bushels were trucked from about 6,000 country elevators, for an average of 92,000 bushels per elevator. Of these 6,000, over 800 shipped all of their grain by truck.

Within the 20 survey areas, the average volume shipped by rail in 1958 differed little from the regional average. Only five areas reported average rail movement varying more than 25 percent from the regional average of 161,000 bushels per elevator using rail, either alone or in conjunction with truck. The areas reporting the highest average rail movement, eastern Illinois and eastern Michigan-northern Ohio, were high production areas. In addition, much of the grain moved to interior processing points or to markets where inbound rail charges were more competitive with the truck rates. The low average rail volume indicated for western South Dakota and southern Ohio is attributed to their relatively low production.

The average truck volume per elevator using truck varied in the several areas. Only eight areas reported truck movement per elevator which averaged within 25 percent of the regional average--92,000 bushels. For the most part, these areas were located within what is commonly termed the Corn Belt, beginning with eastern South Dakota and taking in eastern Iowa, northern Minnesota, Missouri, Indiana, southern Illinois, Michigan, and northern Ohio.

The highest average truck movement was reported from three areas--western and eastern Illinois and southern Minnesota. Each of these is heavily populated with terminal or subterminal outlets using barge as their primary mode for outshipment. Elevators shipping by truck from these areas averaged 84 percent or more above the regional average. This availability of truck outlets resulted in a comparatively greater number of elevators using only trucks for outshipment of grain.

The different grains have varied, and sometimes widely varied, patterns of marketing and distribution. Consequently, it is also necessary to examine them individually because the impact of recent transportation changes have affected some more than others.

Nongovernment Grain Shipments from Country Elevators, by Grains, 1956-58

Country elevators in the North Central Region reported shipments of 1.8 billion bushels of nongovernment grain to all destinations in 1958. This was an increase of almost 25 percent over 1957, and 28 percent over 1956. In 1956, railroads accounted for 71 percent of the shipments, but their share declined to 68 percent in 1957 and 1958. Truck volume increased from almost 28 percent of the total shipments in 1956 to 31 percent in 1957 and 1958. In each year, the barge volume was about the same--1 percent.

TABLE 5.--Estimated number of country elevators shipping nongovernment grain by rail and truck, total volume shipped, and average volume shipped per elevator, North Central Region, by area and mode of transport, 1958

| Area | Elevators in universe | Elevators shipping ¹ grain by-- | | | Total volume ² shipped by-- | | Average volume shipped by-- | |
|--------------------------------------|-----------------------|--|---------------|----------------|--|------------------|-----------------------------|--------------------|
| | | Rail only | Truck only | Rail and truck | Rail | Truck | Rail ³ | Truck ⁴ |
| | <u>Number</u> | <u>Number</u> | <u>Number</u> | <u>Number</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> |
| North Dakota, west..... | 382 | 261 | -- | 121 | 48,277 | 3,469 | 126 | 29 |
| North Dakota, east..... | 502 | 309 | 3 | 190 | 92,776 | 7,538 | 186 | 39 |
| South Dakota, west..... | 164 | 48 | 7 | 109 | 14,157 | 3,026 | 90 | 26 |
| South Dakota, east..... | 373 | 67 | 13 | 293 | 52,039 | 27,516 | 145 | 90 |
| Nebraska, west..... | 272 | 115 | -- | 157 | 37,878 | 8,304 | 139 | 53 |
| Nebraska, east..... | 464 | 183 | 23 | 258 | 58,744 | 15,937 | 133 | 57 |
| Kansas, west..... | 682 | 378 | 14 | 290 | 125,406 | 6,385 | 188 | 21 |
| Kansas, east..... | 510 | 206 | 13 | 291 | 57,234 | 8,640 | 115 | 28 |
| Minnesota, north..... | 236 | 49 | 7 | 180 | 40,754 | 14,406 | 178 | 77 |
| Minnesota, south..... | 450 | 24 | 84 | 342 | 66,100 | 71,903 | 181 | 169 |
| Iowa, west..... | 689 | 186 | 96 | 407 | 106,675 | 34,211 | 180 | 68 |
| Iowa, east..... | 307 | 56 | 56 | 195 | 32,039 | 19,716 | 128 | 79 |
| Missouri, west..... | 184 | 22 | 11 | 151 | 23,571 | 13,478 | 136 | 83 |
| Missouri, east..... | 107 | 20 | -- | 87 | 15,714 | 8,263 | 147 | 95 |
| Illinois, west..... | 392 | 58 | 87 | 247 | 41,990 | 58,437 | 138 | 175 |
| Illinois, east..... | 782 | 117 | 163 | 502 | 156,410 | 117,864 | 253 | 177 |
| Missouri-Illinois-Indiana, south.... | 303 | 41 | 35 | 227 | 37,878 | 25,095 | 141 | 96 |
| West Michigan-North Indiana..... | 754 | 68 | 155 | 531 | 87,817 | 67,165 | 147 | 98 |
| East Michigan-North Ohio..... | 543 | 205 | 36 | 302 | 109,602 | 24,588 | 216 | 73 |
| Ohio, south..... | 392 | 100 | 41 | 251 | 27,819 | 11,104 | 79 | 38 |
| North Central Region..... | 8,488 | 2,513 | 844 | 5,131 | 1,232,880 | 547,045 | 161 | 92 |

¹ Derived by application of appropriate sample ratios to the universe population; see Grain Transportation Statistics for the North Central Region, table 11 (17).

² See Grain Transportation Statistics for the North Central Region, table 21 (17).

³ Representative of elevators shipping by rail only and by truck.

⁴ Representative of elevators shipping by truck only and by rail and truck.

In all 3 years, corn was the major grain shipped, accounting for over one-third of total shipments. Wheat shipments averaged about 27 percent of all shipments; soybeans, about 22 percent; and oats, barley, and sorghums for grain together accounted for about 15 percent during the 3-year period. Each year, individual grain shipments increased at about the same rate as total shipments.

Tables 6 through 11 show the principal areas originating shipments of the various grains, and their location in relation to the Mississippi River. Only the principal shipping areas are discussed in the analysis.

Major shipping areas west of the Mississippi River shipped 65 percent of their corn by rail in 1958, compared to 52 percent in 1956 and 50 percent in 1957. The volume of corn shipped by rail increased 87 percent between 1957 and 1958, compared to a 4-percent increase in corn shipped by truck.

Rail shipments predominated in the movement of wheat from the principal shipping areas west of the river. However, the proportion shipped by truck increased in eastern North Dakota, western South Dakota, northern Minnesota, and western Missouri between 1956 and 1958.

All of the major areas originating grain sorghums are located west of the Mississippi River. Total shipments increased 158 percent between 1956 and 1957, and almost 38 percent between 1957 and 1958. Rail volume absorbed all of this increase and a 35-percent decrease in truck volume between 1956 and 1958 as well.

Corn, wheat, and sorghums for grain accounted for over 71 percent of the total non-government shipments from country elevators in all areas west of the Mississippi River. Soybeans, oats, and barley made up the balance. The share of soybean shipments moved by rail from principal areas declined from 59 percent in 1956 to 48 percent in 1958. Major soybean shipping areas were southern Minnesota and Iowa. Shipments of oats by rail from principal areas accounted for 61 percent of the volume in 1956 and 75 percent in 1958. Truck shipments of barley increased over the 1956-58 period, but total truck movement was minor.

Areas in Minnesota, Iowa, and Missouri increased grain shipments by truck. The relative rail share declined in these States from 66 percent in 1956 to 63 percent in 1958. Grain shipments by rail from North Dakota, South Dakota, Nebraska, and Kansas increased from 79 percent in 1956 to 86 percent in 1958. Total shipments of nongovernment grain from country elevators located west of the Mississippi River increased both by rail and truck, but the proportion shipped by rail increased from 73 percent in 1956 to 76 percent in 1958.

In areas east of the Mississippi River, the major volume was corn, soybeans, wheat, and oats. Although most of the grain moved from country elevators by rail, the relative rail share declined from 71 percent in 1956 to 65 percent in 1957, and to 60 percent in 1958.

Corn was the principal grain shifting to truck. In 1956, the rail share was about two-thirds, but by 1958 it was only one-half. Rail shares of soybeans, wheat, and oats declined, but the decline was less significant than that for corn. The rail share of soybeans dropped from 71 percent in 1956 to 63 percent in 1958. The proportion of wheat shipped by rail declined from 77 percent to 70 percent between 1956 and 1958, and the proportion of oats shipped by rail dropped from 67 percent to 56 percent.

Two areas, western and eastern Illinois, had limited barge shipments from country elevators. From eastern Illinois, these were minor, but from western Illinois, barge volume of corn, soybeans, and wheat increased. The barge share of corn volume jumped from 2 percent in 1956 to almost 18 percent in 1958; similarly, the barge share of soybeans increased from 5 percent to over 9 percent, and of wheat from about 5 percent to almost 16 percent. These increases caused a drop in the relative shares of grain hauled by rail and truck from western Illinois.

TABLE 6.--Corn: Nongovernment shipments from country elevators in areas west and east of the Mississippi River, North Central Region, by mode of transport, 1956-58

| Area of origin | Total shipments | | | | Percentage distribution ¹ | | | | | |
|---------------------------------------|-----------------|-----------|-----------|------|--------------------------------------|---------|---------|---------|---------|---------|
| | | | | | Rail | | | Truck | | |
| | 1956 | 1957 | 1958 | | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| WEST OF MISSISSIPPI RIVER | | | | | | | | | | |
| Major shipping areas: | 1,000 bu. | 1,000 bu. | 1,000 bu. | | Percent | Percent | Percent | Percent | Percent | Percent |
| South Dakota, east..... | 27,028 | 31,591 | 41,044 | 30.4 | 29.0 | | 54.3 | 69.6 | 71.0 | 45.7 |
| Nebraska, east..... | 10,619 | 18,559 | 35,431 | 38.1 | 44.0 | | 64.5 | 61.9 | 56.0 | 35.5 |
| Minnesota, south..... | 56,968 | 66,025 | 81,933 | 44.3 | 37.8 | | 51.5 | 55.7 | 62.2 | 48.5 |
| Iowa, west..... | 46,527 | 49,032 | 79,068 | 72.2 | 74.8 | | 81.8 | 27.8 | 25.2 | 18.2 |
| Iowa, east..... | 11,361 | 16,979 | 28,051 | 75.5 | 75.9 | | 71.2 | 24.5 | 24.1 | 28.8 |
| Subtotal..... | 152,503 | 182,186 | 265,527 | 52.3 | 50.4 | | 64.8 | 47.7 | 49.6 | 35.2 |
| Other areas..... | 31,736 | 29,835 | 42,165 | 49.5 | 38.0 | | 47.9 | 49.0 | 58.4 | 48.3 |
| All areas..... | 184,239 | 212,021 | 307,692 | 51.8 | 48.7 | | 62.5 | 47.9 | 50.8 | 37.0 |
| EAST OF MISSISSIPPI RIVER | | | | | | | | | | |
| Illinois, west..... | 36,327 | 36,770 | 46,849 | 44.2 | 32.8 | | 29.0 | 54.2 | 58.5 | 53.2 |
| Illinois, east..... | 135,597 | 128,895 | 154,206 | 61.9 | 59.5 | | 47.9 | 32.5 | 39.1 | 49.4 |
| Missouri-Illinois-Indiana, south..... | 37,657 | 18,022 | 16,871 | 40.8 | 24.7 | | 28.3 | 52.6 | 75.3 | 71.7 |
| West Michigan-North Indiana..... | 61,895 | 55,775 | 59,905 | 79.3 | 71.1 | | 56.5 | 20.7 | 28.9 | 43.5 |
| East Michigan-North Ohio..... | 47,298 | 34,032 | 41,934 | 90.5 | 82.8 | | 79.4 | 9.5 | 17.2 | 20.6 |
| Ohio, south..... | 29,305 | 23,511 | 18,107 | 78.7 | 70.0 | | 53.8 | 21.3 | 30.0 | 46.2 |
| All areas..... | 348,079 | 297,005 | 337,872 | 66.2 | 59.7 | | 50.1 | 30.8 | 38.5 | 46.2 |
| North Central Region..... | 532,318 | 509,026 | 645,564 | 61.2 | 55.1 | | 56.0 | 36.7 | 43.7 | 41.8 |

¹ Where percentages do not total 100, the balance is barge traffic.
Grain Transportation Statistics for the North Central Region, table 22 (17).

TABLE 7.--Soybeans: Nongovernment shipments from country elevators in areas west and east of the Mississippi River, North Central Region, by mode of transport, 1956-58

| Area of origin | Total shipments | | | Percentage distribution ¹ | | | | | |
|---------------------------|------------------|------------------|------------------|--------------------------------------|------|------|-------|------|------|
| | | | | Rail | | | Truck | | |
| | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| WEST OF MISSISSIPPI RIVER | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> | | | | | | |
| | 35,976 | 40,717 | 43,136 | 49.4 | 37.1 | 38.0 | 50.6 | 62.9 | 62.0 |
| | 28,421 | 38,398 | 39,841 | 70.3 | 69.5 | 61.0 | 29.7 | 30.5 | 39.0 |
| | 9,863 | 13,461 | 17,787 | 58.5 | 56.0 | 45.6 | 41.5 | 44.0 | 54.4 |
| | | | | | | | | | |
| | 74,260 | 92,576 | 100,764 | 58.6 | 53.3 | 48.4 | 41.4 | 46.7 | 51.6 |
| | | | | | | | | | |
| | 24,226 | 28,345 | 39,423 | 66.6 | 61.6 | 56.7 | 30.1 | 35.3 | 40.6 |
| | | | | | | | | | |
| | 98,486 | 120,921 | 140,187 | 60.6 | 55.2 | 50.8 | 38.6 | 44.0 | 48.5 |
| EAST OF MISSISSIPPI RIVER | | | | | | | | | |
| | 29,052 | 33,085 | 40,656 | 57.9 | 53.5 | 48.5 | 36.8 | 43.6 | 42.2 |
| | 60,657 | 74,269 | 77,879 | 71.7 | 72.4 | 65.8 | 27.7 | 26.4 | 33.0 |
| | | | | | | | | | |
| | 25,167 | 21,675 | 30,085 | 80.9 | 70.5 | 72.0 | 19.1 | 29.5 | 28.0 |
| | 32,433 | 40,355 | 50,983 | 65.5 | 56.6 | 50.8 | 34.5 | 43.4 | 49.2 |
| | 22,380 | 26,028 | 34,110 | 82.6 | 81.7 | 79.2 | 17.4 | 18.3 | 20.8 |
| | 4,814 | 6,125 | 6,868 | 75.9 | 78.3 | 81.8 | 24.1 | 21.7 | 18.2 |
| | | | | | | | | | |
| | 174,503 | 201,537 | 240,581 | 71.1 | 67.3 | 62.8 | 27.8 | 31.8 | 35.2 |
| North Central Region..... | | | | | | | | | |
| | 272,989 | 322,458 | 380,768 | 67.3 | 62.8 | 58.4 | 31.7 | 36.4 | 40.1 |

¹ Where percentages do not total 100, the balance is barge traffic.
Grain Transportation Statistics for the North Central Region, table 23 (17).

TABLE 8.--Wheat: Nongovernment shipments from country elevators in areas west and east of the Mississippi River, North Central Region, by mode of transport, 1956-58

| Area of origin | Total shipments | | | | Percentage distribution ¹ | | | | | |
|--|-----------------|-----------|-----------|--|--------------------------------------|---------|---------|---------|---------|---------|
| | | | | | Rail | | | Truck | | |
| | 1956 | 1957 | 1958 | | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| WEST OF MISSISSIPPI RIVER | | | | | | | | | | |
| Major shipping areas: | 1,000 bu. | 1,000 bu. | 1,000 bu. | | Percent | Percent | Percent | Percent | Percent | Percent |
| North Dakota, west..... | 36,812 | 38,883 | 40,969 | | 93.3 | 90.7 | 93.6 | 6.7 | 9.3 | 6.4 |
| North Dakota, east..... | 47,054 | 54,198 | 52,226 | | 96.2 | 95.7 | 93.1 | 3.8 | 4.3 | 6.9 |
| South Dakota, west..... | 9,235 | 9,697 | 13,947 | | 96.6 | 93.3 | 85.4 | 3.4 | 6.7 | 14.6 |
| Nebraska, west..... | 18,510 | 18,282 | 25,392 | | 91.1 | 86.9 | 95.2 | 8.9 | 13.1 | 4.8 |
| Nebraska, east..... | 14,581 | 15,476 | 20,098 | | 97.5 | 97.1 | 97.9 | 2.5 | 2.9 | 2.1 |
| Kansas, west..... | 48,246 | 44,948 | 97,097 | | 96.2 | 92.5 | 97.6 | 3.8 | 7.5 | 2.4 |
| Kansas, east..... | 37,251 | 35,667 | 38,240 | | 93.7 | 91.2 | 93.0 | 6.3 | 8.8 | 7.0 |
| Minnesota, north..... | 8,749 | 11,904 | 11,647 | | 89.9 | 89.7 | 80.8 | 10.1 | 10.3 | 19.2 |
| Missouri, west..... | 12,511 | 12,169 | 15,226 | | 78.8 | 75.8 | 74.1 | 18.5 | 21.0 | 24.4 |
| Subtotal..... | 232,949 | 241,224 | 314,842 | | 93.9 | 91.7 | 93.3 | 6.0 | 8.2 | 6.6 |
| Other areas..... | 26,460 | 16,733 | 22,162 | | 92.6 | 82.2 | 73.9 | 5.2 | 14.2 | 22.4 |
| All areas..... | 259,409 | 257,957 | 337,004 | | 93.7 | 91.1 | 92.0 | 5.9 | 8.6 | 7.7 |
| EAST OF MISSISSIPPI RIVER | | | | | | | | | | |
| Illinois, west..... | 19,943 | 19,189 | 24,604 | | 33.3 | 31.1 | 22.5 | 62.0 | 65.2 | 61.9 |
| Illinois, east..... | 21,147 | 19,545 | 27,562 | | 85.5 | 79.1 | 82.8 | 12.1 | 15.8 | 14.1 |
| Missouri-Illinois-Indiana, south..... | 18,155 | 15,589 | 15,254 | | 78.5 | 77.6 | 73.6 | 21.5 | 22.4 | 26.4 |
| West Michigan-North Indiana..... | 29,593 | 29,388 | 38,638 | | 77.5 | 68.8 | 63.9 | 22.5 | 31.2 | 36.1 |
| East Michigan-North Ohio..... | 34,596 | 31,776 | 46,374 | | 92.6 | 90.0 | 87.7 | 7.4 | 10.0 | 12.3 |
| Ohio, south..... | 10,602 | 11,753 | 12,833 | | 91.8 | 90.5 | 90.3 | 8.2 | 9.5 | 9.7 |
| All areas..... | 134,036 | 127,240 | 165,265 | | 77.4 | 73.1 | 70.5 | 21.6 | 25.6 | 26.7 |
| North Central Region..... | 393,445 | 385,197 | 502,269 | | 88.2 | 85.1 | 84.9 | 11.2 | 14.2 | 13.9 |

¹ Where percentages do not total 100, the balance is barge traffic.

Grain Transportation Statistics for the North Central Region, table 24 (17).

TABLE 9.--Oats: Nongovernment shipments from country elevators in areas west and east of the Mississippi River, North Central Region, by mode of transport, 1956-58

| Area of origin | Total shipments | | | | Percentage distribution ¹ | | | | | |
|--------------------------------|-----------------|-----------|-----------|--|--------------------------------------|---------|---------|---------|---------|---------|
| | | | | | Rail | | | Truck | | |
| | 1956 | 1957 | 1958 | | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| WEST OF MISSISSIPPI RIVER | 1,000 bu. | 1,000 bu. | 1,000 bu. | | Percent | Percent | Percent | Percent | Percent | Percent |
| Major shipping areas: | | | | | | | | | | |
| North Dakota, east..... | 7,338 | 10,424 | 9,504 | | 91.9 | 88.9 | 88.2 | 8.1 | 11.1 | 11.8 |
| South Dakota, east..... | 16,844 | 20,615 | 23,658 | | 32.4 | 55.7 | 70.3 | 67.6 | 44.3 | 29.7 |
| Minnesota, north..... | 13,557 | 18,110 | 16,263 | | 88.4 | 86.7 | 83.5 | 11.6 | 13.3 | 16.5 |
| Minnesota, south..... | 6,092 | 7,097 | 8,643 | | 39.2 | 46.8 | 55.2 | 60.8 | 53.2 | 44.8 |
| Iowa, west..... | 7,811 | 9,267 | 13,732 | | 60.0 | 65.2 | 76.1 | 40.0 | 34.8 | 23.9 |
| Iowa, east..... | 2,540 | 3,718 | 4,979 | | 61.4 | 70.7 | 70.7 | 38.6 | 29.3 | 29.3 |
| Subtotal..... | 54,182 | 69,231 | 76,779 | | 60.6 | 70.0 | 74.7 | 39.4 | 30.0 | 25.3 |
| Other areas..... | 8,418 | 9,116 | 7,084 | | 52.5 | 57.6 | 63.7 | 47.5 | 42.4 | 36.3 |
| All areas..... | 62,600 | 78,347 | 83,863 | | 59.5 | 68.6 | 73.8 | 40.5 | 31.4 | 26.2 |
| EAST OF MISSISSIPPI RIVER | | | | | | | | | | |
| Major shipping areas: | | | | | | | | | | |
| Illinois, west..... | 5,218 | 3,562 | 4,219 | | 58.1 | 51.0 | 73.4 | 41.9 | 49.0 | 23.4 |
| Illinois, east..... | 37,024 | 20,129 | 20,425 | | 60.5 | 47.6 | 40.7 | 39.5 | 52.1 | 58.6 |
| West Michigan-North Indiana... | 6,392 | 3,335 | 5,245 | | 80.2 | 62.5 | 62.7 | 19.8 | 37.5 | 37.3 |
| East Michigan-North Ohio..... | 10,818 | 6,678 | 11,160 | | 87.0 | 84.2 | 73.2 | 13.0 | 15.8 | 26.8 |
| Subtotal..... | 59,452 | 33,704 | 41,049 | | 67.2 | 56.7 | 55.7 | 32.8 | 43.2 | 43.6 |
| Other areas..... | 3,184 | 911 | 1,122 | | 93.2 | 75.4 | 79.5 | 6.8 | 24.6 | 20.5 |
| All areas..... | 62,636 | 34,615 | 42,171 | | 68.5 | 57.2 | 56.3 | 31.5 | 42.7 | 43.0 |
| North Central Region..... | 125,236 | 112,962 | 126,034 | | 64.0 | 65.1 | 67.9 | 36.0 | 34.9 | 31.9 |

¹ Where percentages do not total 100, the balance is barge traffic.
Grain Transportation Statistics for the North Central Region, table 25 (17).

TABLE 10.--Barley: Nongovernment shipments from country elevators, North Central Region, by mode of transport, 1956-58

| Area of origin | Total shipments | | | Percentage distribution | | | | | |
|---------------------------|------------------|------------------|------------------|-------------------------|----------------|----------------|----------------|----------------|----------------|
| | | | | Rail | | | Truck | | |
| | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>Percent</u> | <u>Percent</u> | <u>Percent</u> | <u>Percent</u> | <u>Percent</u> | <u>Percent</u> |
| Major shipping areas: | | | | | | | | | |
| North Dakota, west..... | 12,285 | 10,245 | 8,784 | 99.9 | 99.8 | 97.6 | 0.1 | 0.2 | 2.4 |
| North Dakota, east..... | 32,732 | 31,281 | 35,524 | 98.7 | 98.1 | 98.2 | 1.3 | 1.9 | 1.8 |
| South Dakota, east..... | 1,836 | 1,957 | 4,395 | 90.8 | 90.8 | 94.5 | 9.2 | 9.2 | 5.5 |
| Minnesota, north..... | 13,566 | 12,466 | 13,771 | 91.8 | 89.3 | 86.7 | 8.2 | 10.7 | 13.3 |
| Subtotal..... | 60,419 | 55,949 | 62,474 | 97.2 | 96.2 | 95.3 | 2.8 | 3.8 | 4.7 |
| Other areas..... | 2,733 | 3,238 | 5,746 | 54.0 | 50.0 | 72.2 | 46.0 | 50.0 | 27.8 |
| North Central Region..... | 63,152 | 59,187 | 68,220 | 95.3 | 93.7 | 93.4 | 4.7 | 6.3 | 6.6 |

Grain Transportation Statistics for the North Central Region, table 26 (17).

TABLE 11.--Sorghums for grain: Nongovernment shipments from country elevators, North Central Region, by mode of transport, 1956-58

| Area of origin | Total shipments | | | | Percentage distribution | | | | | |
|---------------------------|------------------|------------------|------------------|--|-------------------------|----------------|----------------|----------------|----------------|----------------|
| | | | | | Rail | | | Truck | | |
| | 1956 | 1957 | 1958 | | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> | | <u>Percent</u> | <u>Percent</u> | <u>Percent</u> | <u>Percent</u> | <u>Percent</u> | <u>Percent</u> |
| Major shipping areas: | | | | | | | | | | |
| South Dakota, east..... | 375 | 3,356 | 3,055 | | 26.7 | 93.0 | 95.8 | 73.3 | 7.0 | 4.2 |
| Nebraska, west..... | 2,394 | 1,818 | 4,554 | | 37.6 | 49.5 | 84.8 | 62.4 | 50.5 | 15.2 |
| Nebraska, east..... | 4,839 | 8,892 | 14,215 | | 62.3 | 89.2 | 94.8 | 37.7 | 10.8 | 5.2 |
| Kansas, west..... | 9,690 | 32,620 | 30,192 | | 27.5 | 83.7 | 90.0 | 72.5 | 16.3 | 10.0 |
| Kansas, east..... | 3,182 | 6,626 | 16,592 | | 47.9 | 78.9 | 93.4 | 52.1 | 21.1 | 6.6 |
| Iowa, west..... | 525 | 1,897 | 4,036 | | 96.0 | 90.2 | 92.1 | 4.0 | 9.8 | 7.9 |
| Missouri, west..... | 1,730 | 2,660 | 6,910 | | 75.7 | 65.3 | 72.1 | 24.3 | 34.7 | 27.9 |
| Missouri, east..... | 117 | 1,006 | 1,421 | | 68.4 | 76.1 | 74.5 | 31.6 | 23.9 | 25.5 |
| Subtotal..... | 22,852 | 58,875 | 80,975 | | 44.2 | 82.7 | 89.8 | 55.8 | 17.3 | 10.2 |
| Other areas..... | 1,277 | 2,446 | 1,919 | | 44.7 | 60.4 | 31.1 | 55.3 | 39.6 | 68.9 |
| North Central Region..... | 24,129 | 61,321 | 82,894 | | 44.2 | 81.8 | 88.4 | 55.8 | 18.2 | 11.6 |

Grain Transportation Statistics for the North Central Region, table 27 (17).

Nongovernment Grain Shipments From Country Elevators by Major Producing Area, 1954 and 1958

Figures 4 through 13 show 1958 shipments of nongovernment grain from country elevators by producing area, type of movement, mode of transport, and principal markets. The designation "other markets" includes both known and unknown destinations. Generally, volume moving to any one of these other markets is believed to be comparatively small. The following paragraphs relate the 1958 data (17) to comparative 1954 data (10), identify the movements by grains, 1956 through 1958, and analyze the shipments by destinations.

Shipments of nongovernment grain by rail and truck from country elevators to markets of first destination in 10 States of the North Central Region (Michigan and Wisconsin excluded to obtain direct comparison) (1, 2) increased about 8 percent from 1954 to 1958 (table 12). Total truck shipments increased 95 percent, while rail shipments dropped 6 percent during the 5-year period. For comparative purposes, the North Central Region is divided into three area groupings: Western, central, and eastern. States comprising the western group are North Dakota, South Dakota, Nebraska, and Kansas. Minnesota, Iowa, and Missouri make up the Central group; and Illinois, Indiana, and Ohio make up the eastern group. Truck receipts increased 128 percent in the central group and 84 percent in the eastern group, but only 40 percent in the western group. Rail receipts declined in the western and central groups, and increased 2 percent from 1954 to 1958 in the eastern group.

Western Group

Grain shipments originating in the western group in 1954 made up 42 percent of the total grain shipped from country elevators in the North Central Region to destinations in the region (table 12). Ninety-five percent of the shipments were made by rail and one-third of the volume originated in Kansas.

Of the total shipments originating in the western group in 1954, 56 percent remained within these States, moving to markets of first destination mainly by rail. Forty-four percent of the grain shipments from the western group went to markets in the central group, predominantly by rail. Grain shipments from the western to the eastern States were negligible.

The volume originating in the western group decreased 10 percent from 1954 to 1958. Rail shipments, following the decreasing pattern of the volume originated, declined over 14 percent. Truck shipments increased 65 percent during the 5-year period, and in 1958, accounted for almost 10 percent of total shipments from the western group. North Dakota was the only State in the western group with increased total rail and truck shipments in 1958.

Shipments from the western to the central group decreased about 8 percent. Grain movement into the eastern group increased slightly from 1954 to 1958, but accounted for less than 0.05 percent of total shipments in 1958.

Central Group

The central group accounted for over 22 percent of the 1954 volume shipped within the North Central Region, 80 percent moving by rail and 20 percent by truck (table 12).

Twenty-seven percent of the volume shipped from the central group moved to destinations in the western and eastern groups, being divided about equally between the two. The bulk of the grain, or 73 percent of total shipments, went to markets of first destination within the central group. Ninety percent of the shipments to the western group, 84 percent of the shipments to the eastern group, and 77 percent of the grain shipped to destinations within the central group moved by rail.

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>NORTH DAKOTA, WEST</u> | | <u>NORTH DAKOTA, EAST</u> | |
|-------------------------------|--------|-------------------------------|---------|
| Intra-area shipments..... | 60 | Intra-area shipments..... | 2,045 |
| Truck..... | 60 | Rail..... | 1,396 |
| Inter-area shipments..... | 51,048 | Truck..... | 649 |
| Rail..... | 47,918 | Inter-area shipments..... | 96,419 |
| To--Minneapolis-St. Paul- | | Rail..... | 90,613 |
| Savage..... | 36,718 | To--Minneapolis-St. Paul- | |
| Duluth-Superior..... | 11,200 | Savage..... | 73,604 |
| Truck..... | 3,130 | Duluth-Superior..... | 16,730 |
| To--Minneapolis-St. Paul- | | Other markets..... | 279 |
| Savage..... | 2,777 | Truck..... | 5,806 |
| Duluth-Superior..... | 340 | To--Minneapolis-St. Paul- | |
| Other markets..... | 13 | Savage..... | 3,945 |
| Inter-regional shipments..... | 414 | Duluth-Superior..... | 1,750 |
| Rail..... | 151 | Other markets..... | 111 |
| To--West..... | 151 | Inter-regional shipments..... | 924 |
| Truck..... | 263 | Rail..... | 197 |
| To--West..... | 224 | To--West..... | 197 |
| Southwest..... | 24 | Truck..... | 727 |
| Southeast..... | 15 | To--West..... | 209 |
| Unknown shipments..... | 224 | Southwest..... | 86 |
| Total shipments..... | 51,746 | East..... | 432 |
| | | Unknown shipments..... | 926 |
| | | Total shipments..... | 100,314 |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 4

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>SOUTH DAKOTA, WEST</u> | | <u>SOUTH DAKOTA, EAST</u> | |
|-------------------------------|--------|-------------------------------|--------|
| Intra-area shipments..... | 490 | Intra-area shipments..... | 1,803 |
| Rail..... | 340 | Truck..... | 1,803 |
| Truck..... | 150 | Inter-area shipments..... | 71,523 |
| Inter-area shipments..... | 16,217 | Rail..... | 51,390 |
| Rail..... | 13,661 | To--Sioux City..... | 31,973 |
| To--Minneapolis-St. Paul- | | Minneapolis-St. Paul- | |
| Savage..... | 12,696 | Savage..... | 15,766 |
| Sioux City..... | 938 | Other markets..... | 3,651 |
| Other markets..... | 27 | Truck..... | 20,133 |
| Truck..... | 2,556 | To--Sioux City..... | 6,948 |
| To--Sioux City..... | 1,537 | Minneapolis-St. Paul- | |
| Minneapolis-St. Paul- | | Savage..... | 4,764 |
| Savage..... | 781 | Other markets..... | 8,421 |
| Other markets..... | 238 | Inter-regional shipments..... | 3,498 |
| Inter-regional shipments..... | 170 | Truck..... | 3,498 |
| Truck..... | 170 | To--West..... | 523 |
| To--Southwest..... | 170 | Southwest..... | 2,875 |
| Unknown shipments..... | 306 | Southeast..... | 100 |
| Total shipments..... | 17,183 | Unknown shipments..... | 2,731 |
| | | Total shipments..... | 79,555 |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 5

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>NEBRASKA, WEST</u> | | <u>NEBRASKA, EAST</u> | |
|-------------------------------|--------|-------------------------------|--------|
| Intra-area shipments..... | 2,412 | Intra-area shipments..... | 35,013 |
| Rail..... | 2,298 | Rail..... | 30,964 |
| Truck..... | 114 | To--Omaha..... | 27,007 |
| Inter-area shipments..... | 31,650 | Other markets..... | 3,957 |
| Rail..... | 30,072 | Truck..... | 4,049 |
| To--Omaha..... | 13,692 | To--Omaha..... | 2,190 |
| Kansas City..... | 10,938 | Other markets..... | 1,859 |
| Other markets..... | 5,442 | Inter-area shipments..... | 29,475 |
| Truck..... | 1,578 | Rail..... | 25,946 |
| To--Omaha..... | 1,068 | To--Kansas City..... | 20,007 |
| Kansas City..... | 318 | Other markets..... | 5,939 |
| Other markets..... | 192 | Truck..... | 3,529 |
| Inter-regional shipments..... | 11,556 | To--Kansas City..... | 1,585 |
| Rail..... | 5,190 | Other markets..... | 1,944 |
| To--West..... | 5,190 | Inter-regional shipments..... | 8,939 |
| Truck..... | 6,366 | Rail..... | 998 |
| To--West..... | 6,042 | To--West..... | 998 |
| Southwest..... | 324 | Truck..... | 7,941 |
| Unknown shipments..... | 564 | To--West..... | 4,759 |
| Total shipments..... | 46,182 | Southwest..... | 3,182 |
| | | Unknown shipments..... | 1,254 |
| | | Total shipments..... | 74,681 |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 6

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>KANSAS, WEST</u> | | <u>KANSAS, EAST</u> | |
|-------------------------------|---------|-------------------------------|--------|
| Intra-area shipments..... | 29,044 | Intra-area shipments..... | 26,659 |
| Rail..... | 28,499 | Rail..... | 22,257 |
| Truck..... | 545 | Truck..... | 4,402 |
| Inter-area shipments..... | 88,651 | Inter-area shipments..... | 34,887 |
| Rail..... | 87,060 | Rail..... | 33,837 |
| To--Salina..... | 32,783 | To--Kansas City..... | 27,996 |
| Kansas City..... | 23,113 | Other markets..... | 5,841 |
| Wichita..... | 20,666 | Truck..... | 1,050 |
| Hastings..... | 3,360 | To--Kansas City..... | 667 |
| Topeka..... | 3,304 | Other markets..... | 383 |
| Lincoln..... | 2,040 | Inter-regional shipments..... | 402 |
| Other markets..... | 1,794 | Rail..... | 72 |
| Truck..... | 1,591 | To--Southwest..... | 72 |
| To--Salina..... | 633 | Truck..... | 330 |
| Kansas City..... | 544 | To--Southwest..... | 330 |
| Wichita..... | 414 | Unknown shipments..... | 3,926 |
| Inter-regional shipments..... | 11,498 | Total shipments..... | 65,874 |
| Rail..... | 8,602 | | |
| To--West..... | 3,400 | | |
| Southwest..... | 5,202 | | |
| Truck..... | 2,896 | | |
| To--West..... | 428 | | |
| Southwest..... | 2,468 | | |
| Unknown shipments..... | 2,598 | | |
| Total shipments..... | 131,791 | | |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 7

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>MINNESOTA, NORTH</u> | <u>MINNESOTA, SOUTH</u> |
|-------------------------------------|-------------------------------------|
| Intra-area shipments.....11,840 | Intra-area shipments..... 75,552 |
| Rail..... 8,056 | Rail.....27,078 |
| Truck..... 3,784 | To--Minneapolis-St. Paul- |
| Inter-area shipments.....40,461 | Savage.....18,216 |
| Rail.....31,373 | Other markets..... 8,862 |
| To--Minneapolis-St. Paul- | Truck.....48,474 |
| Savage.....31,134 | To--Minneapolis-St. Paul- |
| Other markets..... 239 | Savage.....22,587 |
| Truck..... 9,088 | Red Wing.....15,982 |
| To--Minneapolis-St. Paul- | Other markets..... 9,905 |
| Savage..... 8,251 | Inter-area shipments..... 40,761 |
| Other markets..... 837 | Rail.....32,794 |
| Inter-regional shipments..... 1,087 | To--Chicago..... 12,394 |
| Rail..... 431 | Cedar Rapids..... 9,068 |
| To--West..... 361 | Peoria..... 2,802 |
| Southwest..... 70 | Sioux City..... 2,248 |
| Truck..... 656 | Other markets..... 6,282 |
| To--West..... 656 | Truck..... 7,967 |
| Unknown shipments..... 1,772 | To--Cedar Rapids..... 2,445 |
| Total shipments.....55,160 | Ft. Dodge..... 1,625 |
| | Chicago..... 794 |
| | Other markets..... 3,103 |
| | Inter-regional shipments..... 9,558 |
| | Rail..... 2,207 |
| | To--Southwest..... 260 |
| | Wisconsin..... 1,947 |
| | Truck..... 7,351 |
| | To--Southwest..... 4,095 |
| | Wisconsin..... 3,256 |
| | Unknown shipments.....12,132 |
| | Total shipments.....138,003 |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 8

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>IOWA, WEST</u> | <u>IOWA, EAST</u> |
|-------------------------------------|-------------------------------------|
| Intra-area shipments..... 36,584 | Intra-area shipments.....26,769 |
| Rail.....23,184 | Rail.....17,553 |
| To--Des Moines.....20,458 | To--Cedar Rapids.....12,704 |
| Other markets..... 2,726 | Other markets..... 4,849 |
| Truck.....13,400 | Truck..... 9,216 |
| To--Des Moines..... 5,037 | To--Cedar Rapids..... 2,837 |
| Bellmond-Eagle Grove 2,298 | Other markets..... 6,379 |
| Ft. Dodge..... 1,663 | Inter-area shipments.....21,615 |
| Other markets..... 4,402 | Rail.....13,089 |
| Inter-area shipments..... 98,228 | To--Chicago..... 3,932 |
| Rail.....82,401 | Des Moines..... 3,581 |
| To--Cedar Rapids.....21,956 | Peoria..... 1,808 |
| Omaha.....18,148 | Bellmond-Eagle Grove 656 |
| Chicago.....12,419 | Other markets..... 3,112 |
| Peoria..... 8,321 | Truck..... 8,526 |
| Kansas City..... 6,851 | To--Bellmond-Eagle Grove 2,298 |
| Iowa Falls..... 4,237 | Chicago..... 1,269 |
| Other markets.....10,469 | Other markets..... 4,959 |
| Truck.....15,827 | Inter-regional shipments..... 1,136 |
| To--Chicago..... 6,300 | Rail..... 276 |
| Omaha..... 1,255 | To--East..... 172 |
| Minneapolis-St. Paul- | Southeast..... 104 |
| Savage..... 1,014 | Truck..... 860 |
| St. Joseph..... 621 | To--Southwest..... 860 |
| Cedar Rapids..... 497 | Unknown shipments..... 2,235 |
| Other markets..... 6,140 | Total shipments.....51,755 |
| Inter-regional shipments..... 3,913 | |
| Rail.....21 | |
| To--Wisconsin..... 21 | |
| Truck.....3,892 | |
| To--West..... 269 | |
| Southwest..... 3,623 | |
| Unknown shipments..... 2,161 | |
| Total shipments.....140,886 | |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 9

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>MISSOURI, WEST</u> | | <u>MISSOURI, EAST</u> | |
|-------------------------------|--------|-------------------------------|--------|
| Intra-area shipments..... | 30,465 | Intra-area shipments..... | 11,956 |
| Rail..... | 22,327 | Rail..... | 6,566 |
| To--Kansas City..... | 21,912 | To--St. Louis..... | 6,399 |
| Other markets..... | 415 | Other markets..... | 167 |
| Truck..... | 8,138 | Truck..... | 5,390 |
| To--Kansas City..... | 6,177 | To--St. Louis..... | 2,679 |
| Other markets..... | 1,961 | Other markets..... | 2,711 |
| Inter-area shipments..... | 884 | Inter-area shipments..... | 10,460 |
| Rail..... | 649 | Rail..... | 8,715 |
| Truck..... | 235 | Truck..... | 1,745 |
| Inter-regional shipments..... | 5,263 | Inter-regional shipments..... | 1,355 |
| Rail..... | 364 | Rail..... | 222 |
| To--Southeast..... | 364 | To--Southwest..... | 81 |
| Truck..... | 4,675 | East..... | 20 |
| To--Southwest..... | 4,552 | Southeast..... | 121 |
| Southeast..... | 123 | Truck..... | 838 |
| Barge..... | 224 | To--Southwest..... | 838 |
| To--Southwest..... | 224 | Barge..... | 295 |
| Unknown shipments..... | 661 | To--Southwest..... | 295 |
| Total shipments..... | 37,273 | Unknown shipments..... | 3,641 |
| | | Total shipments..... | 27,412 |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 10

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>ILLINOIS, WEST</u> | | <u>ILLINOIS, EAST</u> | |
|-------------------------------|---------|-------------------------------|---------|
| Intra-area shipments..... | 45,020 | Intra-area shipments..... | 181,628 |
| Rail..... | 6,465 | Rail..... | 120,570 |
| To--E. St. Louis..... | 2,592 | To--Decatur, Ill..... | 66,450 |
| Other markets..... | 3,873 | Chicago..... | 16,370 |
| Truck..... | 38,555 | Other markets..... | 37,750 |
| To--E. St. Louis..... | 22,549 | Truck..... | 61,058 |
| Other markets..... | 16,006 | To--Decatur, Ill..... | 17,374 |
| Inter-area shipments..... | 47,952 | Chicago..... | 5,093 |
| Rail..... | 33,032 | Other markets..... | 38,591 |
| To--Decatur, Ill..... | 10,096 | Inter-area shipments..... | 44,520 |
| Peoria..... | 7,925 | Rail..... | 26,133 |
| St. Louis..... | 7,366 | To--St. Louis..... | 17,801 |
| Chicago..... | 1,858 | Other markets..... | 8,332 |
| Davenport..... | 1,667 | Truck..... | 14,714 |
| Other markets..... | 4,120 | To--St. Louis..... | 1,339 |
| Truck..... | 14,282 | Other markets..... | 13,375 |
| To--St. Louis..... | 7,973 | Barge..... | 3,673 |
| Decatur, Ill..... | 3,067 | To--Other markets..... | 3,673 |
| Peoria..... | 2,143 | Inter-regional shipments..... | 38,943 |
| Other markets..... | 1,099 | Rail..... | 2,135 |
| Barge..... | 638 | To--Southwest..... | 292 |
| To--Other markets..... | 638 | East..... | 1,102 |
| Inter-regional shipments..... | 19,633 | Southeast..... | 741 |
| Rail..... | 181 | Truck..... | 36,408 |
| To--East..... | 14 | To--Southwest..... | 139 |
| Southeast..... | 167 | East..... | 20 |
| Truck..... | 3,987 | Southeast..... | 36,249 |
| To--Southwest..... | 794 | Barge..... | 400 |
| Southeast..... | 3,193 | To--Southwest..... | 400 |
| Barge..... | 15,465 | Unknown shipments..... | 15,245 |
| To--Southwest..... | 14,615 | Total shipments..... | 280,336 |
| Southeast..... | 850 | | |
| Unknown shipments..... | 3,925 | | |
| Total shipments..... | 116,530 | | |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 11

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>MISSOURI-ILLINOIS-INDIANA, SOUTH</u> | <u>WEST MICHIGAN-NORTH INDIANA</u> |
|---|--------------------------------------|
| Intra-area shipments.....13,388 | Intra-area shipments..... 76,482 |
| Rail..... 4,917 | Rail.....46,357 |
| Truck..... 8,471 | To--Indianapolis.....29,777 |
| Inter-area shipments.....20,743 | Decatur, Ind..... 7,880 |
| Rail.....18,301 | Battle Creek..... 5,289 |
| To--Decatur, Ill.....6,503 | Other markets..... 3,411 |
| Chicago.....2,635 | Truck.....30,125 |
| Indianapolis.....1,674 | To--Michigan City.....11,246 |
| Decatur, Ind.....1,449 | Decatur, Ind..... 5,716 |
| Lafayette.....1,383 | Indianapolis..... 4,818 |
| St. Louis..... 899 | Other markets..... 8,345 |
| Other markets.....3,758 | Inter-area shipments..... 58,531 |
| Truck..... 2,442 | Rail.....36,592 |
| To--Indianapolis..... 843 | To--Chicago.....17,050 |
| Gibson City..... 707 | Toledo-Maumee- |
| Chicago..... 316 | Ottawa Lake.....14,521 |
| Decatur, Ill..... 236 | Other markets..... 5,021 |
| Other markets..... 340 | Truck.....21,939 |
| Inter-regional shipments.....25,258 | To--Chicago.....12,201 |
| Rail.....13,547 | Toledo-Maumee- |
| To--West..... 31 | Ottawa Lake..... 5,932 |
| Southwest.....3,968 | Other markets..... 3,806 |
| East..... 6 | Inter-regional shipments..... 15,810 |
| Southeast.....9,542 | Rail..... 4,098 |
| Truck.....11,711 | To--East..... 3,286 |
| To--Southwest.....1,190 | Southeast..... 812 |
| Southeast.....10,521 | Truck.....11,712 |
| Unknown shipments..... 3,584 | To--East..... 942 |
| Total shipments.....62,973 | Southeast.....10,770 |
| | Unknown shipments..... 4,159 |
| | Total shipments.....154,982 |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 12

**NONGOVERNMENT GRAIN SHIPPED FROM COUNTRY ELEVATORS IN NORTH CENTRAL REGION
BY PRODUCING AREA, TYPE OF MOVEMENT, AND PRINCIPAL MARKET, 1958**

(1,000 bushels)

| <u>EAST MICHIGAN-NORTH OHIO</u> | <u>OHIO, SOUTH</u> |
|-------------------------------------|-------------------------------------|
| Intra-area shipments.....115,212 | Intra-area shipments.....20,216 |
| Rail.....97,560 | Rail.....16,602 |
| To--Toledo-Maumee- | To--Columbus.....11,505 |
| Ottawa Lake.....54,768 | Other markets..... 5,097 |
| Bellevue-Fostoria.....29,958 | Truck..... 3,614 |
| Other markets.....12,834 | To--Columbus..... 2,556 |
| Truck.....17,652 | Other markets..... 1,058 |
| To--Bellevue-Fostoria..... 6,168 | Inter-area shipments..... 9,216 |
| Toledo-Maumee- | Rail..... 7,246 |
| Ottawa Lake..... 6,312 | To--Toledo-Maumee..... 4,313 |
| Other markets..... 5,192 | Other markets..... 2,933 |
| Inter-area shipments..... 8,814 | Truck..... 1,970 |
| Rail..... 5,808 | To--Decatur, Ind..... 348 |
| Truck..... 3,006 | Toledo-Maumee..... 153 |
| Inter-regional shipments..... 7,908 | Other markets..... 1,469 |
| Rail..... 4,290 | Inter-regional shipments..... 8,492 |
| To--East..... 4,290 | Rail..... 3,300 |
| Truck..... 3,618 | To--East..... 3,217 |
| To--East..... 3,360 | Southeast..... 83 |
| Southeast..... 258 | Truck..... 5,192 |
| Unknown shipments..... 2,256 | To--East..... 230 |
| Total shipments.....134,190 | Southeast..... 4,962 |
| | Unknown shipments..... 999 |
| | Total shipments.....38,923 |

Data from Grain Transportation Statistics for the North Central Region (17).

Figure 13

TABLE 12.--Nongovernment grain shipments by rail and truck from country elevators to known destinations, by area of origin and destination in the North Central Region, 1954 and 1958¹

| Origin of shipments | Destination | | | | | | | | | | | |
|-------------------------|----------------------|-----------|-----------|-----------|-----------|-----------|----------------|-----------|-----------|-----------|-----------|-----------|
| | North Central Region | | | | | | Western group | | | | | |
| | Rail and truck | | Rail | | Truck | | Rail and truck | | Rail | | Truck | |
| | 1954 | 1958 | 1954 | 1958 | 1954 | 1958 | 1954 | 1958 | 1954 | 1958 | 1954 | 1958 |
| Western group: | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. |
| North Dakota..... | 147,220 | 149,572 | 146,466 | 139,927 | 754 | 9,645 | 5,166 | 2,391 | 5,087 | 1,651 | 79 | 740 |
| South Dakota..... | 122,420 | 90,033 | 107,544 | 65,391 | 14,876 | 24,642 | 19,731 | 12,076 | 12,140 | 3,073 | 7,591 | 9,003 |
| Nebraska..... | 114,224 | 98,550 | 105,321 | 89,280 | 8,903 | 9,270 | 109,861 | 92,673 | 101,426 | 83,824 | 8,435 | 8,849 |
| Kansas..... | 192,333 | 179,241 | 185,802 | 171,653 | 6,531 | 7,588 | 185,750 | 174,197 | 180,933 | 166,992 | 4,817 | 7,205 |
| Subtotal..... | 576,197 | 517,396 | 545,133 | 466,251 | 31,064 | 51,145 | 320,508 | 281,337 | 299,586 | 255,540 | 20,922 | 25,797 |
| Central group: | | | | | | | | | | | | |
| Minnesota..... | 142,139 | 168,614 | 116,645 | 99,301 | 25,494 | 69,313 | 2,704 | 1,674 | 1,963 | 849 | 741 | 825 |
| Iowa..... | 118,234 | 183,196 | 91,690 | 136,227 | 26,544 | 46,969 | 13,679 | 26,986 | 11,701 | 25,027 | 1,978 | 1,959 |
| Missouri..... | 51,022 | 57,379 | 40,799 | 39,894 | 10,223 | 17,485 | 26,658 | 33,335 | 25,207 | 26,761 | 1,451 | 6,574 |
| Subtotal..... | 311,395 | 409,189 | 249,134 | 275,422 | 62,261 | 133,767 | 43,041 | 61,995 | 38,871 | 52,637 | 4,170 | 9,358 |
| Eastern group: | | | | | | | | | | | | |
| Illinois..... | 252,579 | 325,538 | 174,915 | 195,999 | 77,664 | 129,539 | 37 | -- | 37 | -- | -- | -- |
| Indiana..... | 141,335 | 141,621 | 127,821 | 87,135 | 13,514 | 54,486 | -- | -- | -- | -- | -- | -- |
| Ohio..... | 102,676 | 104,690 | 88,434 | 86,122 | 14,242 | 18,568 | -- | -- | -- | -- | -- | -- |
| Subtotal..... | 496,590 | 571,849 | 391,170 | 369,256 | 105,420 | 202,593 | 37 | -- | 37 | -- | -- | -- |
| North Central Region... | 1,384,182 | 1,498,434 | 1,185,437 | 1,110,929 | 198,745 | 387,505 | 363,586 | 343,332 | 338,494 | 308,177 | 25,092 | 35,155 |

| Origin of shipments | Destination | | | | | | | | | | | |
|-------------------------|----------------|-----------|-----------|-----------|-----------|-----------|----------------|-----------|-----------|-----------|-----------|-----------|
| | Central group | | | | | | Eastern group | | | | | |
| | Rail and truck | | Rail | | Truck | | Rail and truck | | Rail | | Truck | |
| | 1954 | 1958 | 1954 | 1958 | 1954 | 1958 | 1954 | 1958 | 1954 | 1958 | 1954 | 1958 |
| Western group: | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. |
| Minnesota..... | 142,054 | 147,181 | 141,379 | 138,276 | 675 | 8,905 | -- | -- | -- | -- | -- | -- |
| South Dakota..... | 102,647 | 77,722 | 95,362 | 62,090 | 7,285 | 15,632 | 42 | 235 | 42 | 228 | -- | 7 |
| Nebraska..... | 4,363 | 5,877 | 3,895 | 5,456 | 468 | 421 | -- | -- | -- | -- | -- | -- |
| Kansas..... | 6,583 | 5,044 | 4,869 | 4,661 | 1,714 | 383 | -- | -- | -- | -- | -- | -- |
| Subtotal..... | 255,647 | 235,824 | 245,505 | 210,483 | 10,142 | 25,341 | 42 | 235 | 42 | 228 | -- | 7 |
| Central group: | | | | | | | | | | | | |
| North Dakota..... | 134,171 | 150,937 | 109,444 | 83,243 | 24,727 | 67,694 | 5,264 | 16,003 | 5,238 | 15,209 | 26 | 794 |
| Iowa..... | 80,245 | 114,798 | 59,684 | 80,790 | 20,561 | 34,008 | 24,310 | 41,412 | 20,305 | 30,410 | 4,005 | 11,002 |
| Missouri..... | 14,138 | 19,831 | 7,633 | 9,460 | 6,505 | 10,371 | 10,226 | 4,213 | 7,959 | 3,673 | 2,267 | 540 |
| Subtotal..... | 228,554 | 285,566 | 176,761 | 173,493 | 51,793 | 112,073 | 39,800 | 61,628 | 33,502 | 49,292 | 6,298 | 12,336 |
| Eastern group: | | | | | | | | | | | | |
| Illinois..... | 57,992 | 65,532 | 45,462 | 33,539 | 12,530 | 31,993 | 194,550 | 260,006 | 129,416 | 162,460 | 65,134 | 97,546 |
| Indiana..... | 760 | 285 | 760 | 130 | -- | 155 | 140,575 | 141,336 | 127,061 | 87,005 | 13,514 | 54,331 |
| Ohio..... | -- | -- | -- | -- | -- | -- | 102,676 | 104,690 | 88,434 | 86,122 | 14,242 | 18,568 |
| Subtotal..... | 58,752 | 65,817 | 46,222 | 33,669 | 12,530 | 32,148 | 437,801 | 506,032 | 344,911 | 335,587 | 92,890 | 170,445 |
| North Central Region... | 542,953 | 587,207 | 468,488 | 417,645 | 74,465 | 169,562 | 477,643 | 567,895 | 378,455 | 385,107 | 99,188 | 182,788 |

¹ Data for 1954 derived from Grain Marketing Statistics for the North Central States (10). Shipments to and from Wisconsin and Michigan are excluded. These States were not covered by the 1954 survey. Data for 1958 derived from Grain Transportation Statistics for the North Central Region, tables 28-30 (17).

The volume of grain shipped in 1958 from the central group increased 31 percent over 1954. Rail shipments increased almost 11 percent and truck shipments increased 115 percent; truck shipments accounted for about one-third of the volume shipped in 1958.

Although truck shipments to the western and eastern groups increased, the greatest percentage increase in truck shipments came within the central group. In 1958, truck volume was 39 percent of total shipments to markets within the group. Shipments from the central group to the western group increased 44 percent during the 5-year period, and shipments to the eastern group increased 55 percent. In both the western and eastern groups, truck receipts of grain from the central group doubled, while rail receipts increased 35 percent in the western group, and 47 percent in the eastern group.

Eastern Group

The 1954 volume from the eastern group made up 36 percent of the shipments of grain from country elevators in the North Central Region (table 12). Illinois' volume was 51 percent of the total volume from the eastern States, and 18 percent of the total volume

from the North Central Region. Truck volume originating in the eastern group was the highest of the three divisions of the North Central Region, amounting to 53 percent of total truck movement.

The bulk of shipments in the eastern group went to first destinations within the group; only 12 percent was shipped into the central group. The volume moving from the eastern to western group was negligible. In 1954, truck volume accounted for 21 percent of grain shipments by rail and truck to markets of first destination within the group.

In 1958, 38 percent of the volume for the North Central Region originated in the eastern group. Illinois originated 57 percent of the volume in the eastern group and 22 percent of the volume in the North Central Region. Truck shipments accounted for over 35 percent of the shipments from the eastern group, as the volume shipped by truck increased 92 percent over 1954.

Truck Transportation of Grain From Country Elevators

Although railroads are the predominant carriers of grain from country elevators, the principal diversion of grain shipments to other modes of transport has been to motor-trucks. The following paragraphs review the part played by truck brokers in providing trucks for the movement of grain; the types of motor carriers employed, by kind of grain transported and by type of destination; terminal and subterminal markets, processors, and feeding areas; and the part played by merchant truckers and trucks of other elevators or processors in moving grain from country elevators.

Use of Truck Brokers by Country Elevators²

Although still not common practice among country elevators shipping grain by truck in all areas of the North Central Region, the use of truck brokers is becoming more important as the use of trucks becomes more widespread (17). In 1958, only 175 of the 1,092 elevators trucking grain used truck brokers (table 13). However, 65 percent of these elevators indicated an increased use of brokers since 1955. It is in these years that trucking of grain became important.

The 175 country elevators reporting the use of truck brokers shipped almost 18 million bushels of grain by truck. Brokers handled about 6.5 million bushels. The use of truck brokers was most prevalent in the central areas of the North Central Region. About 20 percent of the sampled elevators trucking grain in Minnesota, Iowa, and Missouri used truck brokers, well above the less than 16 percent east of the Mississippi and the 13 percent from the Dakotas, Nebraska, and Kansas.

For the 175 elevators indicating the use of truck brokers in 1958, the average truck volume was about 102,000 bushels. Truck brokers handled about 37 percent of this grain. Although considerably below the eastern North Central States in truck volume per elevator and in average volume handled by brokers, the central States were above the remainder of the North Central Region in the relationship of broker volume to total volume trucked. For elevators in Minnesota, Iowa, and Missouri truck brokers handled over 42 percent of the truck shipments. The average volume handled by truck brokers in the States east of the Mississippi was about 36 percent of the total truck shipments. In the western Group, less than 30 percent of truck shipments was handled by brokers.

On the basis of sample returns it is estimated that in 1958 over 900 elevators throughout the North Central Region used the services offered by truck brokers. These elevators shipped more than 106 million bushels of grain by truck; brokers arranged for the transportation of some 39 million bushels.

² Truck brokers act as intermediaries between shippers and truckers in arranging for motortruck transportation, either buying grain for the account of a trucker, or simply arranging for the transportation.

TABLE 13.--Use of truck brokers by country elevators in sample, North Central Region, 1958

| Area | Elevators trucking grain | Elevators using truck brokers | | | | | | Elevators increasing use of brokers 1955-58 |
|------------------------------|--------------------------|-------------------------------|-----------------------------|--------------|--|--------------|--------|---|
| | | Elevators | All grain shipped in trucks | | Grain shipped in trucks provided by truck brokers only | | | |
| | | | Volume | Per elevator | Volume | Per elevator | | |
| Western: | Number | Number | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | Number | |
| North Dakota, west..... | 34 | 2 | 28 | 14.0 | 14 | 7.0 | 2 | |
| North Dakota, east..... | 73 | 4 | 180 | 45.0 | 105 | 26.3 | 3 | |
| South Dakota, west..... | 17 | 2 | 53 | 26.5 | 21 | 10.5 | -- | |
| South Dakota, east..... | 46 | 4 | 376 | 94.0 | 40 | 10.0 | 4 | |
| Nebraska, west..... | 26 | 7 | 771 | 110.1 | 197 | 28.1 | 5 | |
| Nebraska, east..... | 49 | 5 | 244 | 48.8 | 98 | 19.6 | 2 | |
| Kansas, west..... | 45 | 12 | 497 | 41.4 | 130 | 10.8 | 9 | |
| Kansas, east..... | 46 | 9 | 249 | 27.7 | 99 | 11.0 | 5 | |
| Total or average..... | 336 | 45 | 2,398 | 53.3 | 704 | 15.6 | 30 | |
| Central: | | | | | | | | |
| Minnesota, north..... | 53 | 10 | 858 | 85.8 | 236 | 23.6 | 5 | |
| Minnesota, south..... | 71 | 5 | 948 | 189.6 | 180 | 36.0 | 3 | |
| Iowa, west..... | 73 | 15 | 1,424 | 94.9 | 657 | 43.8 | 7 | |
| Iowa, east..... | 40 | 16 | 1,329 | 83.1 | 766 | 47.9 | 10 | |
| Missouri, west..... | 29 | 9 | 544 | 60.4 | 362 | 40.2 | 5 | |
| Missouri, east..... | 17 | 1 | 94 | 94.0 | 1 | 1.0 | -- | |
| Total or average..... | 283 | 56 | 5,197 | 92.8 | 2,202 | 39.3 | 30 | |
| Eastern: | | | | | | | | |
| Illinois, west..... | 81 | 6 | 1,651 | 275.2 | 598 | 99.7 | 2 | |
| Illinois, east..... | 130 | 21 | 3,467 | 165.1 | 1,357 | 64.6 | 14 | |
| Mo.-Ill.-Ind., south..... | 45 | 6 | 708 | 118.0 | 136 | 22.7 | 4 | |
| West Michigan-North Indiana. | 111 | 15 | 2,936 | 195.7 | 684 | 45.6 | 14 | |
| East Michigan-North Ohio.... | 56 | 7 | 578 | 82.6 | 331 | 47.3 | 5 | |
| Ohio, south..... | 50 | 19 | 888 | 46.7 | 535 | 28.2 | 14 | |
| Total or average..... | 473 | 74 | 10,228 | 138.2 | 3,641 | 49.2 | 53 | |
| North Central Region..... | 1,092 | 175 | 17,823 | 101.8 | 6,547 | 37.4 | 113 | |

Derived from data in Grain Transportation Statistics for the North Central Region, table 48, (17), and supplementary information.

As might be expected in view of the areas most active in truck brokerage, the predominant grain handled by brokers was corn, primarily from Iowa and the States east of the Mississippi. Soybeans, originating in the same general area, also contributed heavily to the brokers' volume. There was little truck brokerage activity in the major wheat-growing areas. Most of the wheat that was handled by truck brokers originated in Illinois and Indiana.

In the nine areas in which truck brokers were most active, most of the elevators stated the predominant type of motor carrier for moving grain to feeding areas and processing centers was either merchant truckers, who purchased the grain from the elevators, or privately owned or leased trucks. Areas with the least brokerage activity reported little use of merchant truckers and privately owned or leased trucks.

Fees paid to truck brokers in 1958 for their services were seldom more than 2 cents per bushel and usually not more than 1 cent. Although there were isolated instances of fees as high as 4 cents per bushel or as low as one-quarter cent, over 85 percent of the reporting elevators indicated a fee of either 1 or 2 cents, regardless of kind of grain, length of haul, or location of elevator.

Types of Motor Carriers Used for Grain Shipments From Country Elevators

Shipments of grain handled by the following types of motor carriers are analyzed in figures 14 and 15: (1) The common or contract carrier or the regulated for-hire carrier whose routing and rates are under control of the Interstate Commerce Commission. This type of carrier moves grain as a backhaul, and this grain is not subject to rate regulation. (2) The itinerant merchant trucker who purchases the grain from the elevator operator. Many of these merchant truckers have large fleets of vehicles and are well-established businesses. (3) The agricultural exempt carrier (24, 38, 39) who hauls the grain at unregulated rates, receiving compensation from the shipper or the receiver for the transportation service he performs. (4) Trucks owned or leased by the elevator operator. (5) Trucks owned by other elevators or processors.

By Kind of Grain Transported. --The principal motor carriers used by country elevators in 1958 to haul grain varied by type of grain shipped (fig. 15). The following tabulation shows, in order of their importance, the predominant carriers used to handle selected grains:

Corn--itinerant merchant trucker, common or contract carrier, private or leased trucks.

Soybeans--private or leased trucks, common or contract carrier.

Wheat--common or contract carrier, private or leased trucks.

Oats--common or contract carrier, itinerant merchant trucker, private or leased trucks.

Barley--common or contract carrier, itinerant merchant trucker.

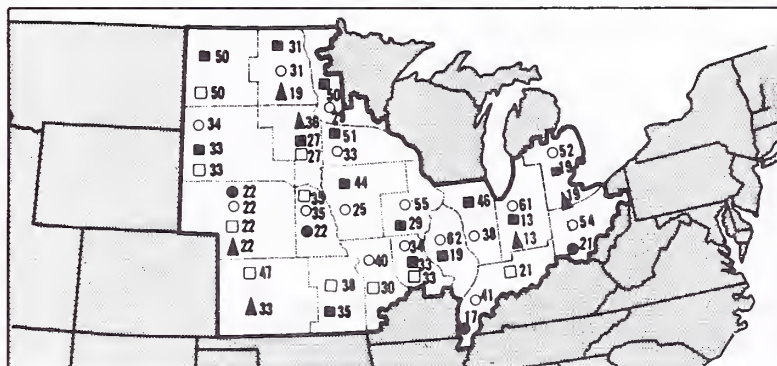
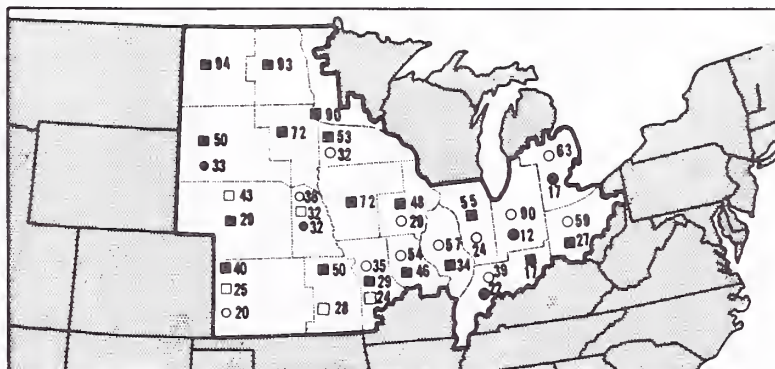
Sorghums for grain--itinerant merchant trucker, common or contract carrier, private or leased trucks.

A significant fact revealed in the preceding tabulation is the relative unimportance of the agricultural exempt carrier as a grain hauler. Of 1,092 country elevators reporting shipments by truck, only about 8 percent reported the agricultural exempt trucker as the principal motor carrier used. While the exempt trucker hauls a large volume of perishable agricultural commodities, evidently grain was not hauled extensively by this carrier in the North Central Region in 1958.

PRINCIPAL TYPES OF MOTOR CARRIERS HAULING GRAIN FROM COUNTRY ELEVATORS

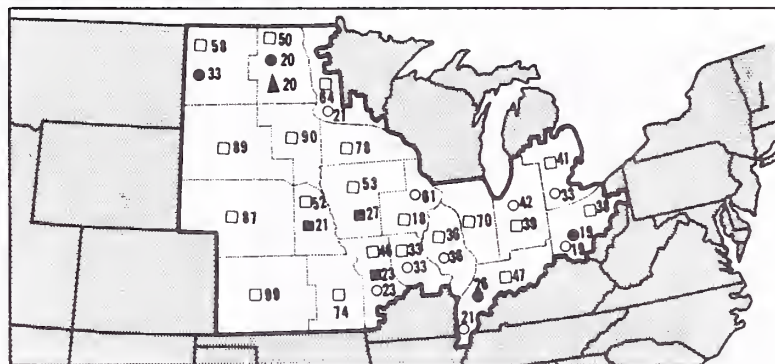
North Central Region, by Type of Market*

To Terminals or
Subterminals



To Processors

To Feeding Areas



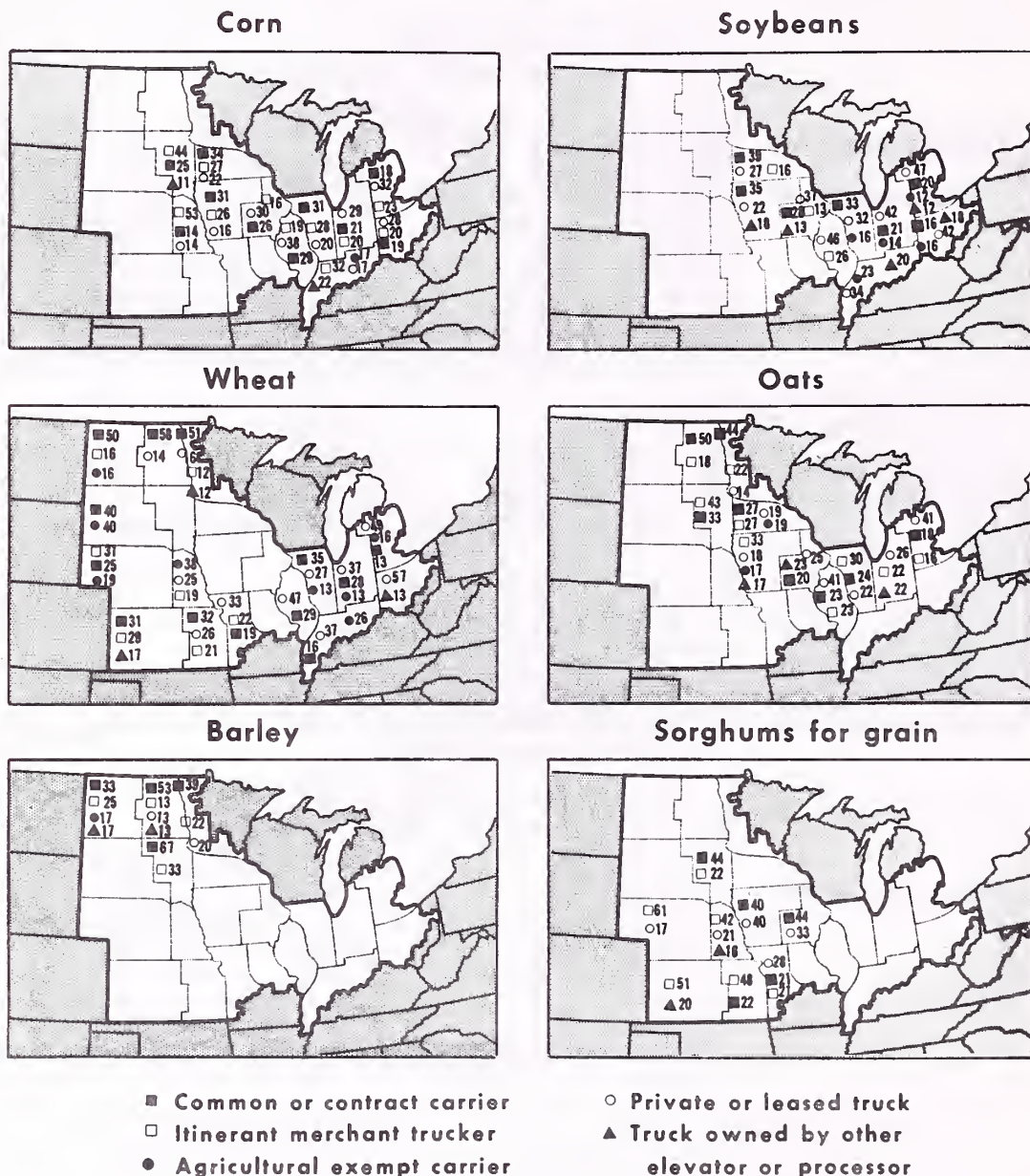
- | | |
|-------------------------------|---|
| ■ Common or contract carrier | ○ Private or leased truck |
| □ Itinerant merchant trucker | ▲ Truck owned by other elevator or processor |
| ● Agricultural exempt carrier | |

* Figures show percentage of country elevators in area reporting the use in 1958 of type of motor carrier indicated. Based on data from Grain Transportation Statistics for the North Central Region, U. S. Department of Agriculture Statis. Bul. 268.

Figure 14

PRINCIPAL TYPES OF MOTOR CARRIERS HAULING GRAIN FROM COUNTRY ELEVATORS

North Central Region, by Shipping Area and Kind of Grain*



*EXPRESSED AS A PERCENTAGE OF TOTAL NUMBER OF COUNTRY ELEVATORS REPORTING IN 1958.

BASED ON DATA FROM GRAIN TRANSPORTATION STATISTICS FOR THE NORTH CENTRAL REGION, U. S. DEPARTMENT OF AGRICULTURE STATIS. BUL. 268.

Figure 15

By Type of Destination. --The common or contract carrier and the private or leased truck were the two major types of motor carriers used most frequently by country elevators to haul grain to terminal or subterminal markets (fig. 14). Forty-six percent of the replies received from the elevators in the North Central Region indicate that the common or contract carrier was the principal type of trucker used. Thirty-two percent of the elevators replying used private or leased trucks extensively.

The private or leased truck and the common or contract carrier were used principally by country elevators to move grain to processors (fig. 14). Thirty-nine percent of the elevators submitting replies used private or leased trucks and 28 percent used common or contract carriers.

The itinerant merchant trucker was the chief means of moving grain from country elevators to feeding areas (fig. 14). Fifty-nine percent of the respondents used this type of trucker. The private or leased truck predominated in only two traffic areas, eastern Iowa and western Michigan-northern Indiana.

In summary, transportation of grain owned by either the operator or the owner of the motor vehicle is dominant for movement of grain by truck from country elevators. This private transportation (in contrast to for-hire transportation that includes the regulated common or contract trucker and the agricultural exempt carrier) was the principal type of trucker employed by 82 percent of the respondents shipping grain by truck to feeding areas, by 65 percent of those moving grain to processors, and by 46 percent of those shipping to terminals and subterminals. Although the for-hire trucker was dominant in movements to terminals and subterminals, the relative importance of private transportation to markets as a whole is indicated in figure 14. Only 8 percent of the country elevators shipping grain to each of the three types of destinations reported the agricultural exempt trucker as the principal type used. However, the common or contract trucker, moving grain as a backhaul under the agricultural exemption, was most frequently used for moving grain to terminals and subterminals and ranked second to private or leased trucks in movements to processors.

Grain Shipments Handled by Merchant Truckers and Trucks
Owned or Operated by Other Elevators or Processors,
1958 Compared to 1954

Merchant truckers and trucks owned or operated by other elevators or processors generally take title to the grain and make payment at the time of loading. Operators of country elevators were asked for their opinion on the degree of change, if any, occurring since 1954 in the volume of grain moved from their facilities by these types of motor carriers. Changes indicated from their replies are shown in table 14.

Of 1,092 elevators shipping grain by truck, 47 percent said they sold grain to merchant truckers, and only 24 percent reported the shipment of grain in trucks owned or operated by other elevators or processors.

In general, the number of elevators served by the merchant trucker appear uniformly distributed over the western, central, and eastern areas of the North Central Region. Replies indicate that little or no change has occurred since 1954 in the volume of grain handled by this type of trucker in the western and central areas. In the eastern area, however, 57 percent of the elevators reported an increase in the volume of grain handled by the merchant trucker.

TABLE 14.--Relative changes in volume of grain hauled by merchant truckers and in trucks owned by other elevators or processors, as reported by country elevators in North Central Region, 1958 compared to 1954

| Area and type of trucker | Elevators reporting | Proportion of elevators reporting that volume hauled had-- | | |
|----------------------------------|---------------------|--|----------------|----------------|
| | | Not changed | Increased | Decreased |
| Western: ¹ | <u>Number</u> | <u>Percent</u> | <u>Percent</u> | <u>Percent</u> |
| Itinerant merchant..... | 174 | 32.2 | 31.6 | 36.2 |
| Other elevator or processor..... | 56 | 26.8 | 42.8 | 30.4 |
| Central: ² | | | | |
| Itinerant merchant..... | 142 | 30.3 | 39.4 | 30.3 |
| Other elevator or processor..... | 87 | 33.3 | 31.0 | 35.6 |
| Eastern: ³ | | | | |
| Itinerant merchant..... | 199 | 34.2 | 56.8 | 9.0 |
| Other elevator or processor..... | 122 | 50.8 | 41.8 | 7.4 |
| North Central Region: | | | | |
| Itinerant merchant..... | 515 | 32.4 | 43.5 | 24.1 |
| Other elevator or processor..... | 265 | 40.0 | 38.5 | 21.5 |

¹ North Dakota, South Dakota, Nebraska, and Kansas.

² Minnesota, Iowa, and Missouri (excluding southeastern portion).

³ Southeastern Missouri, Illinois, Indiana, southern Michigan, and Ohio.

Grain Transportation Statistics for the North Central Region, table 47 (17).

The heaviest concentration of elevators shipping grain in trucks owned or operated by other elevators or processors was in the eastern area (table 14). Over one-half of the elevator operators in this area thought that no change had occurred since 1954, but 42 percent showed an increase. The opinions of the operators in the central area were about equally divided, indicating the overall volume handled by this type of trucker probably did not change. The volume of grain handled by these trucks probably increased slightly in the western area, since a greater percentage of operators reported an increase or no change than reported a decrease.

Freight Rates and the Diversion of Nongovernment Grain Shipments from Railroads to Trucks and Barges

Most significant in the diversion of grain traffic from the railroads to other modes of transport in the post-World War II period has been the increases in rail rates (80). General percentage increases in rates were granted by the Interstate Commerce Commission during this period as a result of railroad requests for higher rates to meet increasing costs. The rail rates for transporting grain doubled between 1946 and 1958. Concurrently, inland waterway channels and highways were being improved and extended. Technological advances in marine equipment and navigation aids and specialization of the tractor-trailer combination for use on the highways increased the economic attractiveness of water and truck transportation of grain. While charges by these modes of transport advanced, rail rates increased more.

Railroad charges for the movement of grain reflect the cost to the carrier of the following services:

Free time for loading and unloading cars;

Switching cars;

Equalized rates over various routings to broad marketing areas;

A single rate for all grains and coverage by this rate of various privileges, including circuitous routing and diversion of shipments to other markets en route;

Stopping, storing, and mixing grain shipments in transit;

Movement of grain products of lighter density at the same rate as the whole grain.

With few deviations railroad rates for grain transportation embodied these services in 1958, although, as this study shows, increasing volumes of grain were moving by other modes of transport.

Generally, truck or water transportation rates for grain embrace only the service of moving the grain from origin to destination. The limited service provided by these modes of transport is reflected in lower charges, although there are basic cost differences among the several competing carriers. Analysis of competing costs, included in "Potential Effects of St. Lawrence Seaway on Costs of Transporting Grain" (16), indicated that usually there was some room for reductions before rail rates on grain would decline to fully distributed costs, and a considerable area for reductions before the rates would decline to out-of-pocket costs. The same study indicated that rates for shipping grain on barges and lake vessels were well above computed costs. Truck rates usually cover the out-of-pocket costs and little more, since so much trucked grain moves as backhaul. Any trucking charges above the level of out-of-pocket costs are determined by railroad competition, competition from other truckers, and the costs of private carriage.

Barge and lake vessels move grain for 3 to 5 mills per short ton-mile (2,000 pounds moving 1 mile) (81). Except for a few country elevators located on commercially navigable inland waterways, grain is not shipped from country points by water; vessels move grain beyond terminal or subterminal markets. Rail charges usually are several times the charge by barge or lake vessel. For the rail movement of grain from Minot, N. Dak., to Baltimore, Md., early 1960 earnings ranged from 12.5 to 22.5 mills per short ton-mile; the higher earnings were for the haul from the country points to the market of first destination--in this case Minneapolis--and the lower earnings were for the haul from that market to Baltimore (92). Trucks compete with rails for grain at country points, and truck charges vary but often are around 17 mills per ton-mile. From Baltimore to Europe, ocean vessel charges are well under 1 mill per ton-mile. The higher gathering, or local, rail charges, as related to distance, from the country elevators to market of first destination permit the diversion of traffic to the trucks.

Truck competition is particularly effective when markets of first destination are located on navigable water and the grain moves from them by low-cost water transportation to mills, processors, feeding areas, or export points on the interconnected inland waterways.

The combination of high local rail rates on grain to markets of first destination and comparatively lower rail rates on grain products and raw grain beyond processing or storage points covers the costs of comprehensive rail service. This combination of rates also is favorable to the processing of grain at points close to areas of grain production (92). If the rail rates prescribed by the Interstate Commerce Commission were higher on flour and feed than on the raw grain, the tendency would be to move grain direct to milling centers in populous areas. This would deprive the States in the grain belt of substantial local industries and tend to increase the cost to farmers of the grain byproducts used as feed.

The fact that rail rates are equalized over several markets between broad producing and consuming areas is of substantial benefit to the grain producer in securing an adequate price for his grain (92). For instance, corn shipped from a point in western Illinois with through rail rates to destinations in the East may move through Chicago, Peoria, Indianapolis, Cincinnati, Toledo, or Buffalo; at each of these there are prospective buyers and sellers of grain. Since the price the farmer receives for grain generally reflects the price at the market less cost of transportation to the market, his income depends directly on the level of the local or gathering rail rates, but the market price reflects the greater demand for grain in the broad marketing area that is available because of the comparatively high local rail rate.

This study shows that more and more trucks are being used to move grain from country elevators to markets of first destination as well as to feeding areas. The lower rail rates beyond the markets do not apply when the grain is moved into the markets by truck. This tends to limit the market for inbound trucked grain to local demand for grain and grain products or to areas that can be reached economically either by truck or by water transportation. The rates charged by trucks for moving grain are not regulated, as grain falls within the agricultural exemption clause of Part II of the Interstate Commerce Act, Section 203 (23)(b)(6). Much of the grain moved by barge also is exempt from rate regulation, as defined by Part III of the Interstate Commerce Act, Section 303(b)(c) for it moves in tows, each made up of three or less bulk commodities. However, the U. S. Supreme Court in the Mechling Case of 1947, 330 U.S. 567, decided that grain moving by barge at regulated rates into a market is entitled to outbound movement by rail at published proportional or reshipping rates no higher than those accorded shipments coming in by lake or rail.

The extensive growth of highways and waterways has facilitated movement of grain by truck and water to broad consuming areas. Thus grain transportation has become highly competitive.

The railroads for many years relied on a backlog of grain shipments controlled by the Government because, as the study shows, except for a very minor volume, the Government has moved its grain by rail. The comprehensive services covered by rail rates have facilitated the advantageous disposal of grain owned by the Government at minimum transportation costs. With the advent of the Agricultural Trade Development and Assistance Act of 1954, Public Law 480, and its subsequent payment-in-kind application in 1956 to the disposal of surplus wheat (United States Department of Agriculture, Commodity Stabilization Service, Announcement No. GR-345) and in 1958 to the disposal of surplus feed grain (Commodity Stabilization Service, Announcement No. GR-368), control over the routing and mode of transport for grain redeemed from Government storage was given to the grain merchandiser (78). This action, along with increased storage of grain at interior points (table 2), sharply decreased the volume of grain moving by rail to some markets.

Although the railroads reacted in some specific instances before and during 1958 to meet truck and barge competition by reducing their grain rates between given origins and destinations, major changes in rail rates generally were delayed until the opening of the St. Lawrence Seaway in April 1959. (The effects of rail rate increases and reductions occurring before January 1, 1959, as reported by country elevator operators, are analyzed in "Specific Effects of Rail Rate changes on Grain Shipments," page 68.)

Rail rates for grain transportation can be broadly divided into those applying to movement of grain for domestic consumption and those applying to grain that is destined for other countries. Between applicable origins and destinations, export rates usually are considerably less than domestic rates, the theory being that these lower overland rail rates permit our grain exporters to better compete in foreign markets.

Movements to River Destinations

In 1958, 48 percent of the total nongovernment grain shipments from country elevators to known destinations moved to markets located on inland waterways of the North Central Region (table 15). Of this amount, 72 percent was shipped by rail.

For statistical purposes the waterways are divided as follows: Illinois Waterway--Peoria, Ill., and northward; Illinois Waterway--south of Peoria; Upper Mississippi River--Davenport, Iowa, and northward; Lower Mississippi River--south of Davenport (to the Missouri-Arkansas State line); Missouri River; and the Ohio River (fig. 2).

Major river markets in the North Central Region are Minneapolis-St. Paul, Minn.; Chicago and Peoria, Ill.; St. Louis, Mo.-E. St. Louis, Ill.; Omaha, Nebr.; Kansas City, Mo.-Kans.; St. Joseph, Mo., and Evansville, Ind. (fig. 16). These markets received 86 percent of the grain shipped from country elevators to river destinations; 95 percent of the rail shipments and 63 percent of the truck shipments to river destinations terminated at these destinations.

About 20 percent of all volume moving to river destinations was shipped to markets on the Illinois Waterway, Peoria, Ill., and northward. Chicago and Peoria were the principal markets, with combined receipts by rail and truck of about 126 million bushels, or 81 percent of total shipments from country elevators to the waterway. About 99 percent of the rail shipments to the Illinois Waterway, Peoria and northward, and almost 54 percent of the truck shipments terminated at Chicago and Peoria. Corn receipts accounted for 64 percent of total receipts on the waterway; soybeans, 16 percent; wheat, 12 percent; and oats, barley, and grain sorghums, the remaining 8 percent. Rail receipts were 61 percent of the total volume shipped to the waterway.

The Illinois Waterway, south of Peoria, received about 3 percent of the total volume of grain shipped to river destinations. Fifty-six percent of the receipts were corn; forty-two percent were soybeans and wheat. Nearly all of the receipts were shipped by truck and nearly all of the volume originated in Illinois.

Points on the Upper Mississippi River--Davenport, Iowa, and northward--received 35 percent of the volume moving to all river destinations within the North Central Region. Over three-fourths of the receipts were by rail. Wheat accounted for about one-third of the volume with 72 percent originating in North Dakota. Corn and barley made up about 43 percent of the total receipts. The bulk of the barley was shipped by rail from North

TABLE 15.--Rail and truck shipments of nongovernment grain from country elevators to river destination areas, North Central Region, 1958

| Destination | Rail | Truck | Total |
|--|------------------|------------------|------------------|
| | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> |
| Illinois Waterway, Peoria and north..... | 94,596 | 59,942 | 154,538 |
| Illinois Waterway, south of Peoria..... | 101 | 21,216 | 21,317 |
| Upper Mississippi River..... | 202,538 | 64,198 | 266,736 |
| Lower Mississippi River..... | 45,032 | 42,895 | 87,927 |
| Missouri River..... | 190,983 | 17,817 | 208,800 |
| Ohio River ¹ | 7,565 | 7,067 | 14,632 |
| Total..... | 540,815 | 213,135 | 753,950 |

¹ Does not include grain movements to ports in Kentucky.

Map of the United States showing grain export gateways and domestic destinations.

Legend:

- Grain origins, transfer points, markets, or domestic destinations
- **PORTS:** export gateways for grain

Map Labels:

Coastal Ports (Grain Origins/Transfer Points): Portland, Seattle, San Francisco, Los Angeles, San Diego, New Orleans, Houston, Fort Worth, Dallas, Chicago, New York, Baltimore, Philadelphia, Washington, New Orleans.

Major Grain Origins/Transfer Points: Minneapolis, St. Paul, Des Moines, Omaha, Lincoln, Kansas City, St. Louis, Chicago, St. Louis, Kansas City, Omaha, Lincoln, St. Paul, Minneapolis, Chicago, New York, Baltimore, Philadelphia, Washington, New Orleans.

Major Grain Highways: Interstates 5, 10, 20, 25, 30, 35, 40, 45, 55, 65, 70, 75, 80, 90, 95.

Major Grain Storage Facilities: Minneapolis, St. Paul, Des Moines, Omaha, Lincoln, Kansas City, St. Louis, Chicago, New York, Baltimore, Philadelphia, Washington, New Orleans.

AGRICULTURAL MARKETING SERVICE

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Dakota, and over one-half of the corn was received by truck, 70 percent from southern Minnesota. The major market on the Upper Mississippi River was Minneapolis-St. Paul, receiving 87 percent of the total shipments, 93 percent of the rail shipments, and 69 percent of the truck shipments.

The Lower Mississippi River, south of Davenport, received 12 percent of the volume moving to river destinations. The St. Louis-E. St. Louis market received the bulk of the shipments, accounting for 83 percent of the total receipts on the Lower Mississippi River. Illinois shipped in 70 percent of the grain, eastern Missouri, 15 percent, and Iowa 12 percent. Truck receipts were 49 percent of the total, the bulk coming from western Illinois and eastern Missouri. Corn receipts were 40 percent of the total volume, and soybeans and wheat each accounted for about 28 percent.

Shipments from country elevators to points on the Missouri River were about 28 percent of total grain shipments to river destinations in 1958. Two-thirds of the shipments were from Nebraska and Kansas; and over 30 percent were from western Iowa and Missouri. Wheat was the major grain received, accounting for 46 percent of total receipts. Corn contributed over 23 percent; sorghums for grain, 19 percent; and soybeans, 10 percent. Oats and barley together accounted for slightly less than 2 percent. Kansas City and Omaha are major markets on the Missouri River.

Total receipts on the Ohio River were about 2 percent of grain receipts at river destinations. Seventy-seven percent of the grain shipped to the Ohio River (ports in Kentucky excluded) (81) was received from Missouri-Illinois-Indiana, south, and 14 percent came from southern Ohio. Soybeans and wheat made up about 75 percent of total receipts with about equal volumes of each. Corn receipts made up most of the balance.

Shipments of grain from country elevators to river destinations for transfer to barge are increasing. The combination truck-barge movement often is more economical than movement by rail at existing rail rates (16). Much of the grain trucked from country elevators to river destinations is transferred to barges, or shipped out from the terminals by barge. Comparatively low rail rates for reshipping grain or grain products do not apply for inbound trucked grain, and the most advantageous movement outbound is by truck or barge.

Country elevator operators indicated that of the total volume shipped by truck from their elevators in 1958 to known destinations in the North Central Region, 27 percent was trucked to nearby river elevators or barge transfer facilities, compared with 23 percent in 1956 (table 16). Some of this movement could have been to other country elevators, but probably most of it was to terminal or subterminal facilities. For 1958, this movement came to 68 percent of the total truck shipments to river destinations (table 15).

Country elevators in the western area accounted for only a small portion of the grain trucked to nearby river elevators in 1958. North Dakota and South Dakota are not served by any commercially navigable rivers. Nebraska and Kansas have available only the Missouri River, which in 1958 had inadequate channels and limited transfer facilities and bargeline service compared to the Mississippi, Illinois, or Ohio Rivers.

The central States of Minnesota, Iowa, and Missouri have the Mississippi and the Missouri Rivers available for water transportation. In 1958, about 29 percent of the grain shipped by truck from country elevators in the central area was shipped to nearby river elevators or barge transfer facilities. Such facilities are available from Minneapolis-St. Paul southward on the Mississippi River, plus Omaha, Kansas City, and several Iowa, Kansas, and Missouri points on the Missouri River.

The eastern area has available the most complete system of commercially navigable waterways. The Illinois Waterway extends through Illinois; the Mississippi River borders this area on the west and the Ohio River on the south. In 1958, country elevators in the eastern area trucked over 98 million bushels of grain to nearby river destinations. This volume was more than two-thirds of the regional movement of grain to nearby river points.

TABLE 16.--Total truck shipments of grain, truck shipments from country elevators to nearby river elevators with barge loading facilities, and percentage relationship of total truck shipments and truck shipments to river destinations, by area of origin, North Central Region, 1956-58¹

| Origin ² | Total truck shipments | | | Truck shipments to nearby river destinations | | | Truck shipments to nearby rivers as percentage of total truck shipments | | |
|---|-----------------------|--------------|--------------|--|--------------|--------------|---|------|------|
| | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | Pct. | Pct. | Pct. |
| Kansas, east..... | 8,811 | 9,253 | 8,640 | 26 | -- | 53 | 0.3 | -- | 0.6 |
| Other..... | 69,713 | 78,855 | 72,175 | -- | -- | -- | -- | -- | -- |
| Total, western..... | 78,524 | 88,108 | 80,815 | 26 | -- | 53 | (³) | -- | .1 |
| Minnesota, north..... | 8,789 | 11,990 | 14,406 | 331 | 1,513 | 1,581 | 3.8 | 12.6 | 11.0 |
| Minnesota, south..... | 54,147 | 71,074 | 71,903 | 16,289 | 24,813 | 34,062 | 30.1 | 34.9 | 47.4 |
| Iowa, west..... | 24,731 | 28,048 | 34,211 | 48 | 207 | 1,932 | .2 | .7 | 5.6 |
| Iowa, east..... | 7,966 | 11,277 | 19,716 | 889 | 2,111 | 4,530 | 11.2 | 18.7 | 23.0 |
| Missouri, west..... | 6,441 | 8,563 | 13,478 | 611 | 1,602 | 1,843 | 9.5 | 18.7 | 13.7 |
| Missouri, east..... | 2,323 | 2,942 | 8,263 | 609 | 895 | 3,596 | 26.2 | 30.4 | 43.5 |
| Total, central..... | 104,397 | 133,894 | 161,977 | 18,777 | 31,141 | 47,544 | 18.0 | 23.3 | 29.4 |
| Illinois, west..... | 44,963 | 50,222 | 58,437 | 29,508 | 32,692 | 38,257 | 65.6 | 65.1 | 65.5 |
| Illinois, east..... | 78,313 | 83,658 | 117,864 | 31,808 | 34,110 | 41,464 | 40.6 | 40.8 | 35.2 |
| Missouri-Illinois-Indiana, south..... | 30,498 | 26,301 | 27,577 | 6,343 | 5,841 | 6,361 | 20.8 | 22.2 | 23.1 |
| W. Michigan-N. Indiana ⁴ | 32,098 | 44,124 | 67,165 | 3,553 | 7,589 | 12,314 | 11.1 | 17.2 | 18.3 |
| Other..... | 20,885 | 24,669 | 35,692 | -- | -- | -- | -- | -- | -- |
| Total, eastern..... | 206,757 | 228,974 | 306,735 | 71,212 | 80,306 | 98,396 | 34.4 | 35.1 | 32.1 |
| Total, 12 areas..... | 299,080 | 347,452 | 441,660 | 90,015 | 111,447 | 145,993 | 30.1 | 32.1 | 33.1 |
| Total, North Central Region.. | 389,678 | 450,976 | 549,527 | 90,015 | 111,447 | 145,993 | 23.1 | 24.7 | 26.6 |

¹ Includes corn, soybeans, wheat, oats, barley, and sorghums for grain.

² Only those areas situated on or near commercially navigable rivers with country elevators indicating shipments to nearby barge loading facilities are identified.

³ Less than 0.05 percent.

⁴ Truck shipments were to nearby lake destinations for barge movement.

Grain Transportation Statistics for the North Central Region, tables 20 and 21 (17) and supplementary information gathered from country elevators in 1958.

Illinois alone accounted for 81 percent of the grain trucked to nearby barge transfer points within the eastern area, and 55 percent of the regional total. Country elevators in western Michigan-northern Indiana trucked over 12 million bushels of grain to nearby transfer points; most of this volume was trucked from origins in Indiana to nearby lake points for barge movements to terminal points.

The most significant increase in truck shipments of grain from country elevators to river elevators was found in the central area. The volume trucked to river elevators or barge transfer facilities in the central area jumped from less than 19 million bushels in 1956 to nearly 48 million bushels in 1958, a 153-percent increase over the 3-year period. The eastern area's volume from country elevators to nearby river elevators or barge facilities increased only 38 percent, but amounted to over 27 million bushels. The volume from country elevators in the western areas in 1958 was only 53,000 bushels, under 0.1 percent of the total grain trucked from these areas.

Movements to Major Markets

In this section comparative rail and truck rates, effective on October 1, 1958, for the movement of grain into seven major markets, are illustrated graphically with diagrams and tables showing 1958 volumes of nongovernment grain shipped from country elevators to these markets, by mode of transport, distance shipped, and State of origin.

Excluding shipments of nongovernment grain from country elevators in Michigan, about 678 million bushels were shipped to the seven major markets in 1958 and about 666 million bushels in 1954, (10, 17) for an increase in 1958 of 2 percent over 1954. Slightly over 5 percent moved by truck in 1954 and almost 19 percent moved by truck in 1958.

The graphic presentations of rail rates show the applicable distance scales into the indicated markets. Rates per 100 pounds have been converted to cents per bushel of 56 pounds. Although the scales are the basis for determining the rates from origins in territories where the scales apply into the designated markets, there are numerous exceptions. Exact rates can only be determined by consulting published tariffs. Rail rates are plotted for the shortest rail distances. The truck rate scales show rates for highway distances (17).

Kansas City, Missouri and Kansas, and Omaha, Nebraska. --The comparative levels of domestic rail and truck rates to major markets of first destination drawing grain predominantly from country elevators in Kansas and Nebraska are shown in figure 17. Truck rates are below or about the same as rail rates for distances of 200 miles or less into the Kansas City and Omaha markets. For greater distances, local rail rates into the markets exceed truck rates.

Figures 18 and 19 and table 17 show nongovernment grain movements by mileage zones into the Kansas City and Omaha markets.

In 1958, 92 percent of the total nongovernment grain shipments from country elevators to the Kansas City market moved by rail. Truck volume totaled over 10 million bushels, 8 percent of the total rail and truck shipments of about 126 million bushels. About 62 percent of the truck volume originated from distances of 100 miles or less.

Ninety-three percent of the 67 million bushels shipped to Omaha by rail and truck moved by rail.

In 1954, over 97 percent of the 197 million bushels of nongovernment grain shipped to these markets by country elevators arrived by rail. Truck inroads into grain traffic destined for these markets from country elevators appear to be minor through 1958 although overall volume declined about 2 percent between 1954 and 1958 and the truck share increased from less than 3 to almost 8 percent in the same period.

Minneapolis-St. Paul, Savage, and Duluth, Minnesota, and Superior, Wisconsin. --Figure 20 indicates the relative levels of rail and truck rates from country elevators into the Minneapolis-St. Paul, Savage, and Duluth-Superior markets as of October 1, 1958. No export rail rates on grain to either of these markets were published in 1958. Grain was trucked into these markets predominantly as backhaul by regulated truckers. Truck rates generally were about the same as or only slightly under the published rail rates.

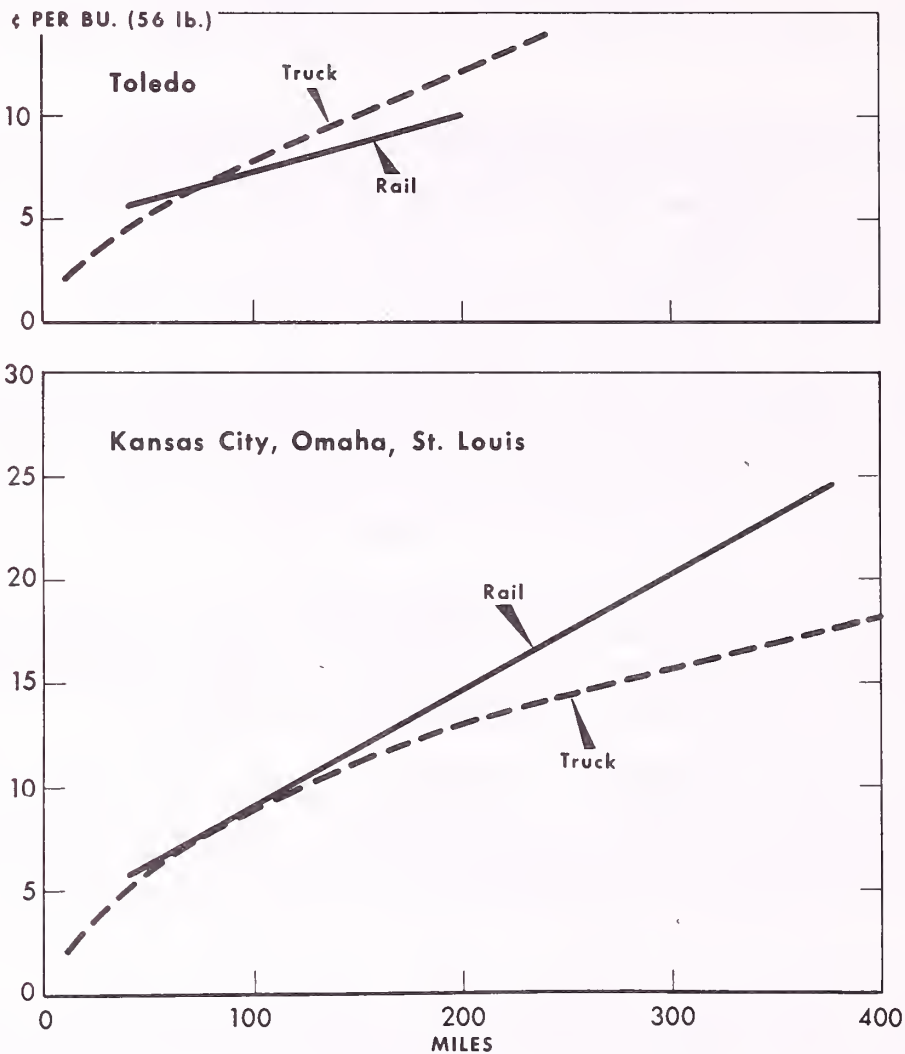
Each of these markets is located on commercially navigable water. From Duluth-Superior the grain moved mostly by lake vessel, principally to Buffalo for milling or for rail movement to the Atlantic Coast for domestic use and export. The Minneapolis market shipped heavy volumes of grain by barge to the southeastern domestic market and to the ports of New Orleans and Baton Rouge, largely for export. As indicated in table 17 and figures 21 and 22, the grain originated in North Dakota, Minnesota, and South Dakota, although South Dakota shipments from country elevators to Duluth-Superior were small. The receipts at these markets exclude any volume from Wisconsin (1, 2). Except for barley, a rather substantial volume of all grains moving to these markets was by truck.

Country elevators shipped 81 percent of over 232 million bushels of nongovernment grain to the Minneapolis market by rail in 1958.

While the railroads were dominant in all movements of over 100 miles, truck shipments originated principally from distances under 300 miles. Although the volume of nongovernment grain received at the Minneapolis market by rail and truck from country elevators was about the same in 1954 as in 1958, the truck share increased from just over 4 percent to 19 percent during this period.

GRAIN TRANSPORTATION CHARGES, NORTH CENTRAL REGION

Truck and Rail Charges to Toledo, Kansas City,
Omaha, and St. Louis



Highway charges from Grain Transportation Statistics for the North Central Region, figures 6 and 7, U.S. Dept. of Agric. Statis. Bul. 268. Rail charges from WTL 21-4800 distance scale and NYC F. T. 701-A, ICC 1169.

DATA FOR 1958

U.S. DEPARTMENT OF AGRICULTURE

NEG 8365-6(1) AGRICULTURAL MARKETING SERVICE

Figure 17

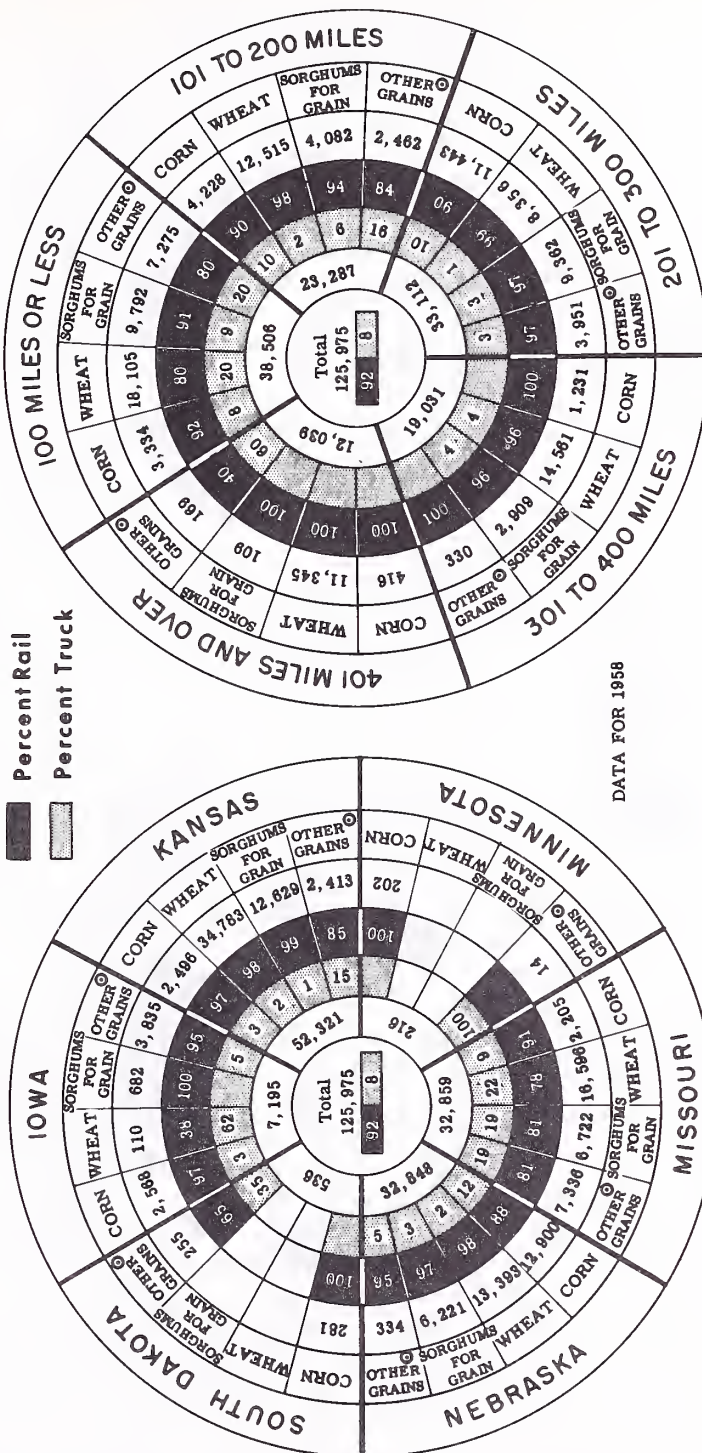
In 1958 country elevators shipped over 41 million bushels of nongovernment grain to Duluth-Superior, and 90 percent of the volume moved by rail (fig. 22). Duluth-Superior and Minneapolis-St. Paul serve as markets for country elevators in Minnesota, North Dakota, and South Dakota. Many grain handling facilities in each market have common ownership, and some of the owners have lines of country elevators in these States. The volume moving to the Duluth-Superior market in 1958 was dictated largely by the demand at Buffalo for grain from Duluth-Superior. The St. Lawrence Seaway, which has since

NONGOVERNMENT GRAIN SHIPPED BY RAIL AND TRUCK TO KANSAS CITY*

From Country Elevators in North Central Region

States of Origin
(1,000 Bu.)

Distance Shipped
(1,000 Bu.)



DATA FOR 1958

* Kansas City, Mo. - Kansas City, Kans.
 © Includes soybeans, oats, and barley.

Data from Grain Transportation Statistics for the North Central Region,
 U. S. Department of Agriculture Statist. Bul. 268.

Figure 18

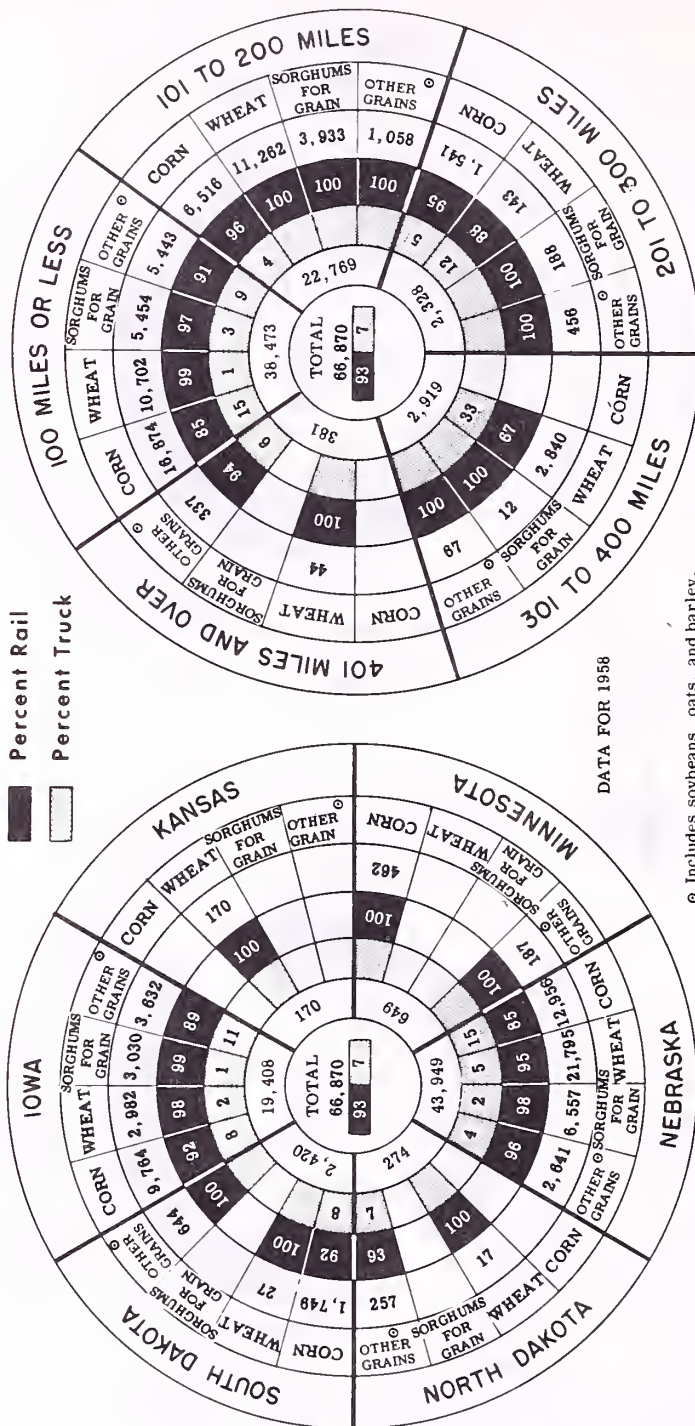
NONGOVERNMENT GRAIN SHIPPED BY RAIL AND TRUCK TO OMAHA, NEBR.

From Country Elevators in North Central Region

States of Origin
(1,000 Bu.)

Distance Shipped
(1,000 Bu.)

■ Percent Rail
□ Percent Truck



Data from Grain Transportation Statistics for the North Central Region,
U. S. Department of Agriculture Status. Bul. 268.

Figure 19

TABLE 17.--Nongovernment grain shipped by rail and truck from country elevators to selected markets in the North Central Region, by State of origin and by distance moved, 1958¹

| Destination, State of origin, and distance moved | Volume | | Percentage distribution | | Destination, State of origin, and distance moved | Volume | | Percentage distribution | |
|--|-----------|-----------|-------------------------|---------|--|-----------|-----------|-------------------------|---------|
| | Rail | Truck | Rail | Truck | | Rail | Truck | Rail | Truck |
| KANSAS CITY, MO.-KANS.: | 1,000 bu. | 1,000 bu. | Percent | Percent | | 1,000 bu. | 1,000 bu. | Percent | Percent |
| Iowa..... | 6,850 | 345 | 95.2 | 4.8 | Less than 100 miles.. | 9,553 | 30,193 | 24.0 | 76.0 |
| Kansas..... | 51,108 | 1,213 | 97.7 | 2.3 | 101-200 miles..... | 25,273 | 4,027 | 86.3 | 13.7 |
| Minnesota..... | 202 | 14 | 93.5 | 6.5 | 201-300 miles..... | 1,214 | 704 | 63.3 | 36.7 |
| Missouri..... | 26,310 | 6,549 | 80.1 | 19.9 | 301-400 miles..... | 235 | 351 | 40.1 | 59.9 |
| Nebraska..... | 30,945 | 1,903 | 94.2 | 5.8 | Over 400 miles..... | 1,684 | -- | 100.0 | -- |
| South Dakota..... | 448 | 88 | 83.6 | 16.4 | MINNEAPOLIS-ST. PAUL & SAVAGE, MINN.: | | | | |
| Less than 100 miles... | 32,241 | 6,265 | 83.7 | 16.3 | Iowa..... | 124 | 1,018 | 10.9 | 89.1 |
| 101-200 miles..... | 21,929 | 1,358 | 94.2 | 5.8 | Minnesota..... | 49,363 | 30,825 | 61.6 | 38.4 |
| 201-300 miles..... | 31,485 | 1,627 | 95.1 | 4.9 | North Dakota..... | 110,322 | 6,722 | 94.3 | 5.7 |
| 301-400 miles..... | 18,271 | 760 | 96.0 | 4.0 | South Dakota..... | 28,449 | 5,561 | 83.7 | 16.3 |
| Over 400 miles..... | 11,937 | 102 | 99.2 | .8 | Less than 100 miles.. | 3,199 | 17,379 | 15.5 | 84.5 |
| OMAHA, NEBR.: | | | | | 101-200 miles..... | 32,137 | 11,139 | 74.3 | 25.7 |
| Iowa..... | 18,151 | 1,257 | 93.5 | 6.5 | 201-300 miles..... | 43,519 | 10,367 | 80.8 | 19.2 |
| Kansas..... | 170 | -- | 100.0 | -- | 301-400 miles..... | 42,447 | 1,571 | 96.4 | 3.6 |
| Minnesota..... | 649 | -- | 100.0 | -- | Over 400 miles..... | 66,956 | 3,670 | 94.8 | 5.2 |
| Nebraska..... | 40,693 | 3,256 | 92.6 | 7.4 | DULUTH, MINN.-SUPERIOR, WIS.: | | | | |
| North Dakota..... | 255 | 19 | 93.1 | 6.9 | Minnesota..... | 9,157 | 2,194 | 80.7 | 19.3 |
| South Dakota..... | 2,286 | 134 | 94.5 | 5.5 | North Dakota..... | 27,930 | 2,090 | 93.1 | 6.9 |
| Less than 100 miles... | 35,114 | 3,359 | 91.3 | 8.7 | South Dakota..... | -- | 41 | -- | 100.0 |
| 101-200 miles..... | 22,515 | 254 | 98.9 | 1.1 | Less than 100 miles.. | -- | -- | -- | -- |
| 201-300 miles..... | 2,242 | 86 | 96.3 | 3.7 | 101-200 miles..... | -- | 256 | -- | 100.0 |
| 301-400 miles..... | 1,971 | 948 | 67.5 | 32.5 | 201-300 miles..... | 14,285 | 3,292 | 81.3 | 18.7 |
| Over 400 miles..... | 362 | 19 | 95.0 | 5.0 | 301-400 miles..... | 8,291 | 394 | 95.5 | 4.5 |
| CHICAGO, ILL.: | | | | | Over 400 miles..... | 14,511 | 383 | 97.4 | 2.6 |
| Illinois..... | 19,115 | 5,093 | 79.0 | 21.0 | TOLEDO-MAUMEE, OHIO-OTTAWA LAKE, MICH.: | | | | |
| Indiana..... | 18,804 | 11,796 | 61.5 | 38.5 | Indiana..... | 12,696 | 1,234 | 91.1 | 8.9 |
| Iowa..... | 16,345 | 7,571 | 68.3 | 31.7 | Michigan..... | 30,336 | 9,437 | 76.3 | 23.7 |
| Michigan..... | -- | 719 | -- | 100.0 | Ohio..... | 30,582 | 1,726 | 94.7 | 5.3 |
| Minnesota..... | 12,394 | 794 | 94.0 | 6.0 | Less than 100 miles.. | 53,232 | 7,234 | 88.0 | 12.0 |
| Missouri..... | 67 | -- | 100.0 | -- | 101-200 miles..... | 19,879 | 5,163 | 79.4 | 20.6 |
| Less than 100 miles... | 14,867 | 11,590 | 56.2 | 43.8 | 201-300 miles..... | 503 | -- | 100.0 | -- |
| 101-200 miles..... | 19,151 | 5,702 | 77.1 | 22.9 | Over 300 miles..... | -- | -- | -- | -- |
| 201-300 miles..... | 5,761 | 1,772 | 76.5 | 23.5 | ST. LOUIS, MO.-E. ST. LOUIS, ILL.: | | | | |
| 301-400 miles..... | 9,849 | 6,843 | 59.0 | 41.0 | Illinois..... | 28,513 | 31,945 | 47.2 | 52.8 |
| Over 400 miles..... | 17,097 | 66 | 99.6 | .4 | Indiana..... | -- | 155 | -- | 100.0 |
| ST. LOUIS, MO.-E. ST. LOUIS, ILL.: | | | | | Iowa..... | 1,288 | 351 | 78.6 | 21.4 |
| Illinois..... | 28,513 | 31,945 | 47.2 | 52.8 | Minnesota..... | 663 | -- | 100.0 | -- |
| Indiana..... | -- | 155 | -- | 100.0 | Missouri..... | 7,495 | 2,824 | 72.6 | 27.4 |
| Iowa..... | 1,288 | 351 | 78.6 | 21.4 | | | | | |
| Minnesota..... | 663 | -- | 100.0 | -- | | | | | |
| Missouri..... | 7,495 | 2,824 | 72.6 | 27.4 | | | | | |

¹ Derived from Grain Transportation Statistics for the North Central Region, Tables 38-43, (17).

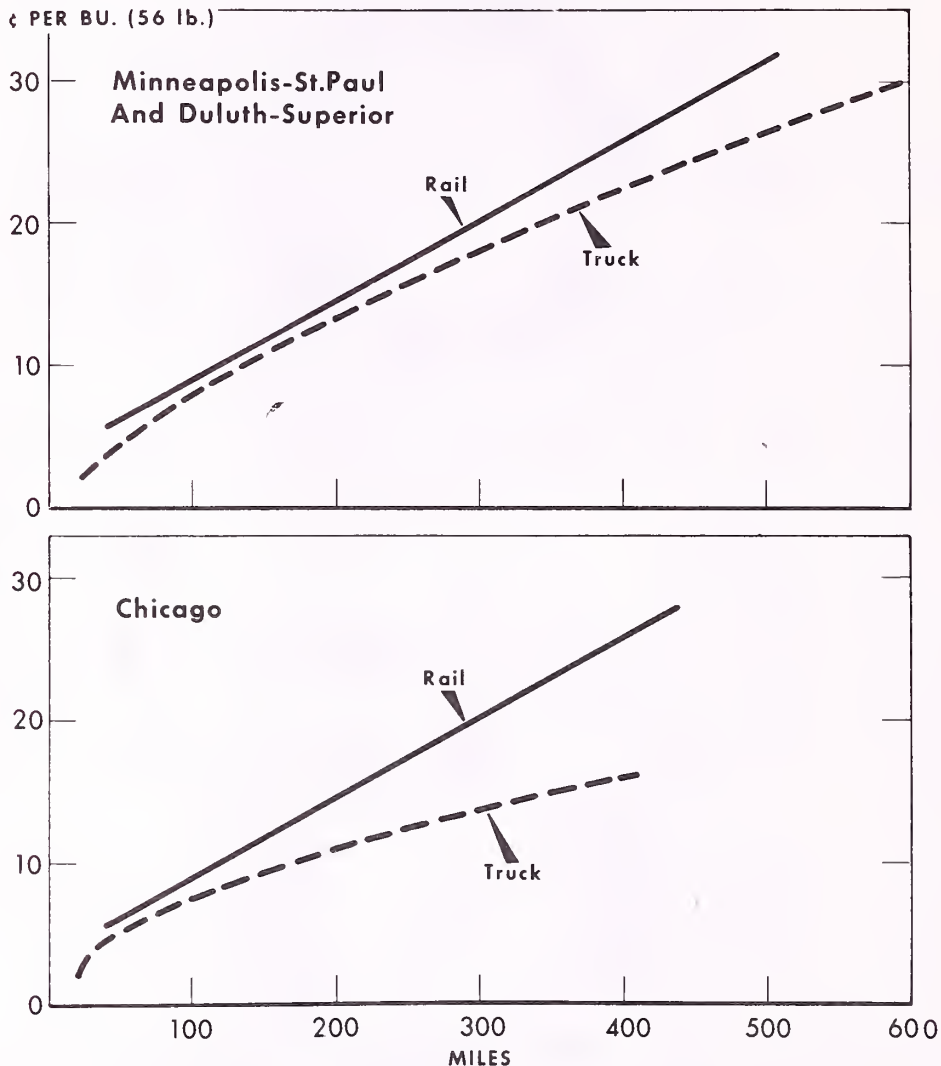
created a strong export demand at Duluth, was not open in 1958. Probably a substantial volume of grain moving from country elevators to the Minneapolis market moves on to Duluth; this movement is interterminal and not covered by these country elevator data.

Practically all of the nongovernment grain moving to Duluth-Superior originated from country elevators that were over 200 miles away, since little grain is grown at points closer to the market. The truck volume was heaviest in the 201- to 300-mile bracket. There was practically no truck movement of grain from country elevators into the Duluth-Superior market in 1954. Computed truck receipts in 1958 aggregated over 4 million bushels.

Chicago, Illinois.--In 1958, no export rail rates on grain into the Chicago market were published, but comparatively low proportional rates for grain were applicable from the western markets. Figure 20 indicates that rail rates into the Chicago market from western origins generally were competitive with truck rates for distances up to 150 miles from Chicago. For greater distances, local rail rates to Chicago exceeded truck charges.

GRAIN TRANSPORTATION CHARGES, NORTH CENTRAL REGION

Truck and Rail Charges to Minneapolis-St. Paul,
Duluth-Superior, and Chicago



Highway charges from Grain Transportation Statistics for the North Central Region, figures 6 and 7, U. S. Department of Agriculture Statistical Bulletin 268. Rail charges from WTL 21-4800 distance scale.

DATA FOR 1958

U. S. DEPARTMENT OF AGRICULTURE

NEG 8368-61(1) AGRICULTURAL MARKETING SERVICE

Figure 20

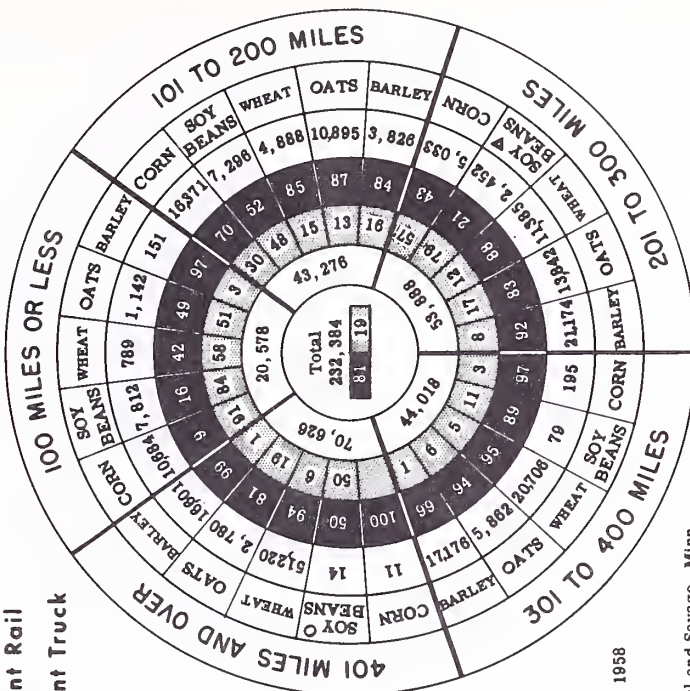
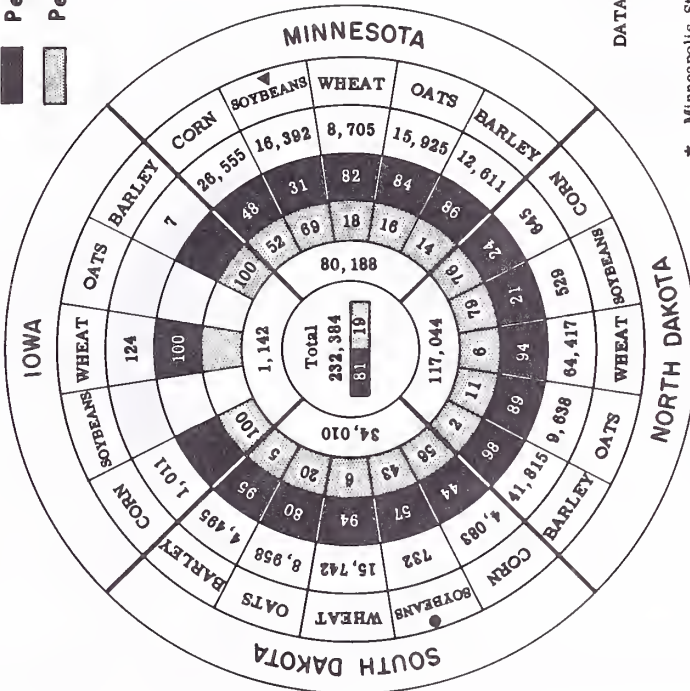
Interior grain-processing points in Illinois and Iowa, the St. Louis market, and elevators located along the Upper Mississippi and Illinois Rivers draw heavy volumes of grain that might otherwise move to Chicago from country elevators. Much of the grain moving to elevators on the Illinois River is transshipped by barge to Chicago and St. Louis. Many of these river elevators are subterminal facilities owned by grain merchandising firms in the major markets, and their barge volume is an interterminal movement, not covered by these country elevator data.

NONGOVERNMENT GRAIN SHIPPED BY RAIL AND TRUCK TO MINNEAPOLIS - ST. PAUL AND SAVAGE*

From Country Elevators in North Central Region

States of Origin
(1,000 Bu.)

Distance Shipped
(1,000 Bu.)



DATA FOR 1958

- * Minneapolis-St. Paul and Savage, Minn.
- ▲ Includes 23,000 bu. of sorghums for grain.
- Includes 61,000 bu. of sorghums for grain.
- ▲ Includes 70,000 bu. of sorghums for grain.
- Includes 14,000 bu. of sorghums for grain.

Data from Grain Transportation Statistics for the North Central Region,
U. S. Department of Agriculture Status. Bul. 268.

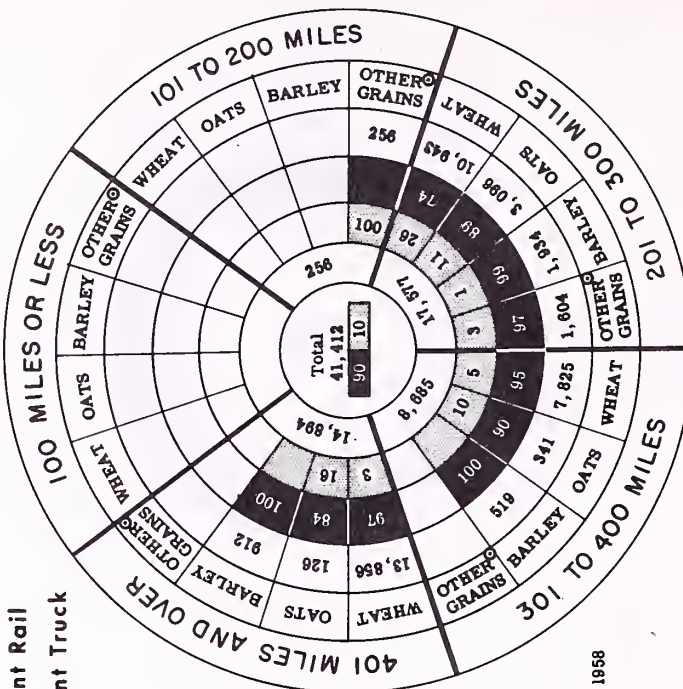
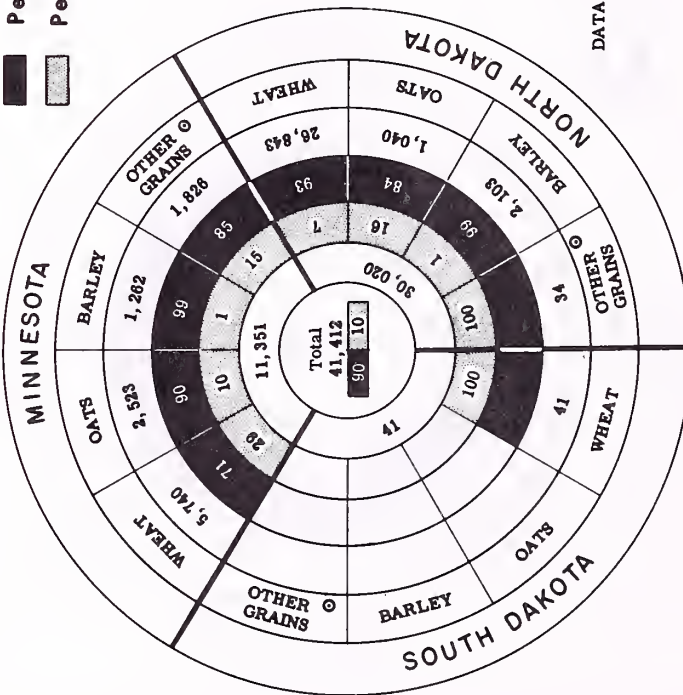
Figure 21

NONGOVERNMENT GRAIN SHIPPED BY RAIL AND TRUCK TO DULUTH-SUPERIOR *

From Country Elevators in North Central Region

States of Origin
(1,000 Bu.)

Distance Shipped
(1,000 Bu.)



DATA FOR 1958

* Duluth, Minn., and Superior, Wis.

© Includes corn and soybeans

Data from Grain Transportation Statistics for the North Central Region,
U. S. Department of Agriculture Statist. Bul. 268.

U. S. DEPARTMENT OF AGRICULTURE

NEG 8370-61 (1) AGRICULTURAL MARKETING SERVICE

Figure 22

Figure 23 and table 17 indicate nongovernment grain shipments from country elevators into the Chicago market. Country elevators shipped about 93 million bushels of grain by rail and truck to Chicago in 1958, of which over 82 percent moved by rail and 28 percent by truck. The trucks' share was heaviest from origins less than 100 miles from Chicago, and from the 301- to 400-mile zone. The heavy truck share from 301-400 miles reflects the corn moving as backhaul from Iowa,

Grain movement to Chicago from 201-300 miles is restricted because of competition from other outlets in this mileage range as well as the heavy movement from Illinois and Indiana to southeastern markets.

In 1954, country elevators shipped 8 percent of their nongovernment grain to Chicago by truck. In 1958, it was 28 percent. Total nongovernment grain shipments from country elevators to Chicago declined 9 percent between 1954 and 1958. The rail volume declined 29 percent.

St. Louis, Missouri, and E. St. Louis, Illinois--Rail and truck rates, as of October 1, 1958, to the St. Louis market were competitive from distances up to 200 miles from the market (fig. 17). For greater distances, local rail rates into the market exceeded truck rates. St. Louis, located on the Mississippi River, has favorable rail rates to many markets in the east and southeast. It is a large processing center, drawing grain principally from country elevators in Illinois and much smaller volumes from Missouri. The principal competing outlet for grain from southern Illinois is the southern market. From Missouri, a substantial volume of grain also moves to Arkansas. River elevators along the Mississippi, Illinois, and Missouri Rivers draw much grain from country elevators in Missouri and Illinois.

In 1958, out of over 73 million bushels of nongovernment grain moving from country elevators to St. Louis, 48 percent moved by truck (fig. 24 and table 17); the heaviest movement was from elevators within 100 miles of St. Louis. The heavy truck volume reflects the availability of barge transportation at the market for outbound shipments.

In 1954, over 50 million bushels of nongovernment grain moved from country elevators to St. Louis; about 20 percent of it was trucked. Although grain receipts by rail and truck from country elevators were 45 percent greater in 1958 than in 1954, the relative rail share declined from 80 to 52 percent.

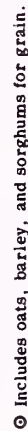
Toledo-Maumee, Ohio, and Ottawa Lake, Michigan--Rail and truck rates from country elevators to the Toledo market are shown in figure 17. The rail rate scale to this market reflects charges from country elevators located on lines of the New York Central Railroad in Michigan, Ohio, and Indiana. Michigan accounted for 46 percent of Toledo's rail and truck receipts from country elevators (fig. 25 and table 17); Ohio for about 38 percent; and Indiana for 16 percent.

Although truck rates are below or about the same as rail rates for distances of 150 miles or less, trucked grain volume from country elevators into the Toledo market from Ohio and Indiana is restricted by numerous interior markets in Indiana and Ohio. These markets include Decatur, Indianapolis, and Michigan City, Indiana; Bellevue, Fostoria, Lima, and Columbus, Ohio. Chicago is an important market for Indiana grain as are Ohio River ports and the Southeastern States. Buffalo and other eastern markets receive much grain from Ohio.

Figure 25 shows that country elevators within 100 miles of the Toledo market originated 70 percent of the nongovernment grain receipts, with 12 percent, or over 7 million bushels, moving by truck (table 17). Of the volume moving distances of 101 to 200 miles, 21 percent, or more than 5 million bushels, moved by truck.

Comparative 1954 statistics do not include grain moving from country elevators in Michigan to the Toledo market (10). Excluding Michigan grain, Toledo receipts of nongovernment grain from country elevators in 1958 totaled 46 million bushels, about 92

From Country Elevators in North Central Region



Data from Grain Transportation Statistics for the North Central Region,
U. S. Department of Agriculture Statist. Bul. 268.

Figure 23

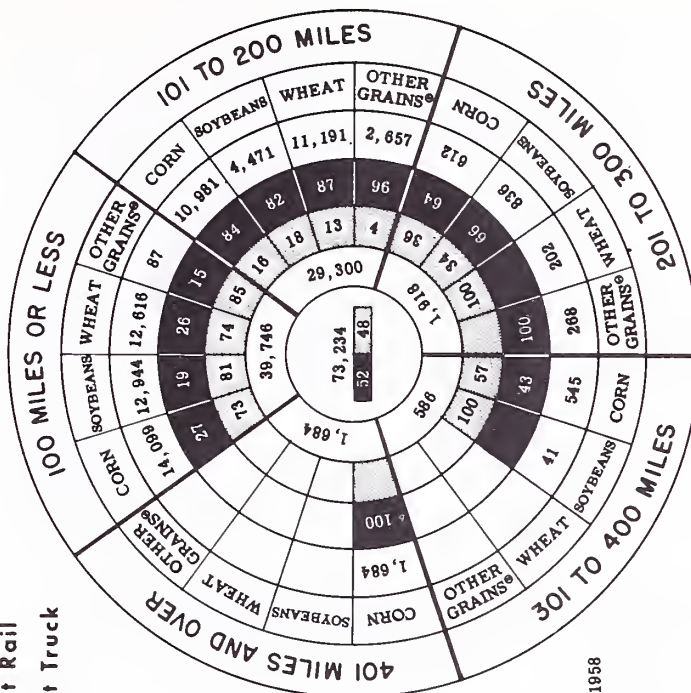
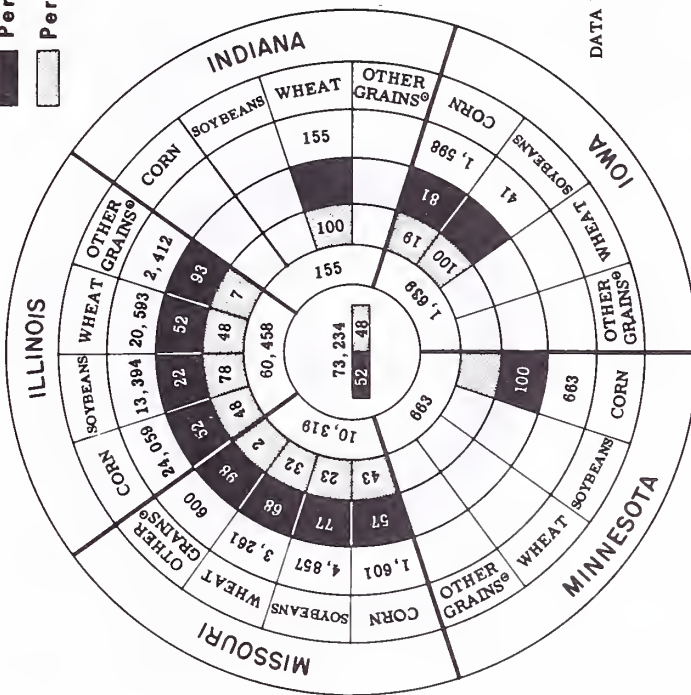
NONGOVERNMENT GRAIN SHIPPED BY RAIL AND TRUCK TO ST. LOUIS-EAST ST. LOUIS *

From Country Elevators in North Central Region

States of Origin
(1,000 Bu.)

Distance Shipped
(1,000 Bu.)

Percent Rail
 Percent Truck



DATA FOR 1958

* St. Louis, Mo.-East St. Louis, Ill.

^o Includes oats, barley, and sorghums for grain.

Data from Grain Transportation Statistics for the North Central Region,
U. S. Department of Agriculture Statist. Bul. 268.

U. S. DEPARTMENT OF AGRICULTURE

NEG 6372-6(11) AGRICULTURAL MARKETING SERVICE

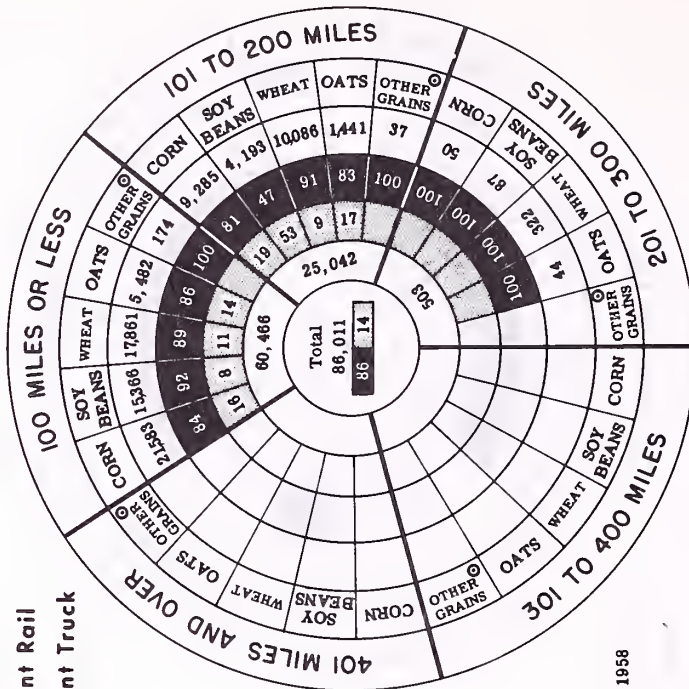
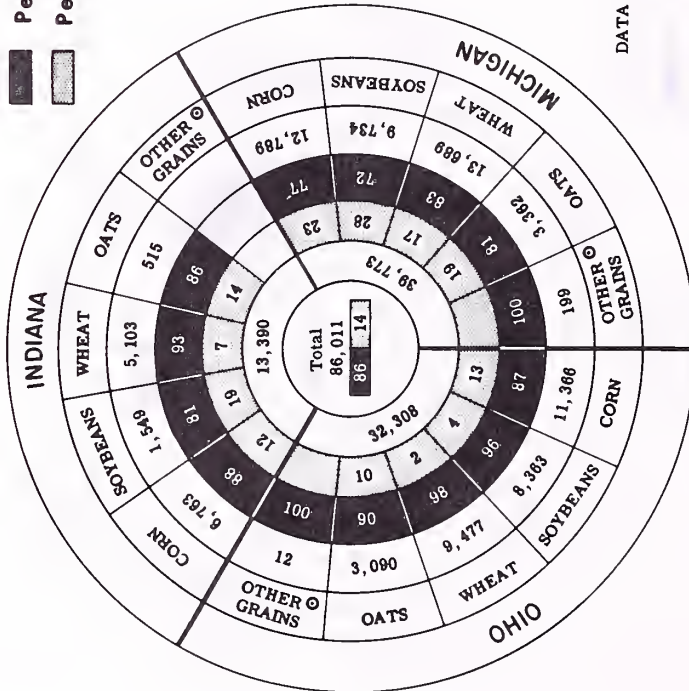
Figure 24

NONGOVERNMENT GRAIN SHIPPED BY RAIL AND TRUCK TO TOLEDO, MAUMEE, AND OTTAWA LAKE*

From Country Elevators in North Central Region

States of Origin
(1,000 Bu.)

Distance Shipped
(1,000 Bu.)



DATA FOR 1958

- * Toledo and Maumee, Ohio; Ottawa Lake, Mich.
- Includes barley and sorghums for grain.

Data from Grain Transportation Statistics for the North Central Region,
U. S. Department of Agriculture Statis. Bul. 268.

Figure 25

percent of which was received by rail. Comparable 1954 traffic aggregated 35 million bushels, and about 95 percent was moved by rail. Although total volume increased 31 percent, the proportion moved by rail declined.

Other Markets. --The movement of grain from country points to major markets is greatly influenced by other available markets. The pattern of grain movement indicates that there are many small interior markets which are gathering points for locally grown grain; these markets either process or ship the grain to one of the major markets or direct to consuming areas. These lesser markets, which contain branches of line elevator companies or cooperative elevator associations, draw the bulk of their receipts from within the State or from adjoining States. The grain received is usually confined to the major crops for the area in which the market is located.

In 1958, Decatur, Ill., ranked third in total receipts of nongovernment grain moving to all markets, drawing 94 percent of its grain from Illinois (table 18) and the rest principally from Iowa and Missouri. Rail shipments into Decatur from country elevators were 81 percent of total receipts and 80 percent of the intra-State receipts. Ninety-one percent of the receipts were corn and soybeans.

Over 76 percent of the grain receipts at Cedar Rapids, Iowa, originated in Iowa, and over 23 percent in southern Minnesota. Eighty-eight percent of the grain was shipped by rail to Cedar Rapids. Of the intra-State shipments, 91 percent were by rail. Corn and oats accounted for 84 percent of total receipts at Cedar Rapids.

Sioux City, Iowa, located on the western Iowa State line, received 94 percent of its grain from South Dakota, and 5 percent from southern Minnesota; eighty percent was received by rail. Nebraska furnished about 1 percent of Sioux City's receipts. Eighty-four percent of the receipts at Sioux City was corn and oats.

These eight markets received almost 25 percent of the grain shipped from country elevators to markets of first destination in the North Central Region in 1958. These eight markets and the seven major markets combined received 71 percent of the grain shipped from country elevators in the North Central Region.

TABLE 18.--Shipments of nongovernment grain to selected markets by country elevators in North Central Region, by kind of grain, 1958

| Market | Corn | Soy-beans | Wheat | Oats | Barley | Sorghums for grain | Total |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|--------------------|-----------|
| | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. | 1,000 bu. |
| Decatur, Illinois... | 39,287 | 58,905 | 8,133 | 1,395 | -- | 72 | 107,792 |
| Cedar Rapids, Iowa.. | 29,461 | 7,540 | 248 | 12,442 | -- | -- | 49,691 |
| Sioux City, Iowa.... | 24,308 | 804 | 3,167 | 12,517 | 268 | 2,895 | 43,959 |
| Indianapolis, Indiana | 16,923 | 13,548 | 8,827 | 1,980 | -- | 12 | 41,290 |
| Salina, Kansas..... | 492 | -- | 29,802 | -- | 159 | 9,321 | 39,774 |
| Bellevue-Fostoria, Ohio..... | 12,648 | 12,973 | 9,224 | 2,333 | 54 | -- | 37,232 |
| Peoria, Illinois.... | 27,522 | 2,614 | 1,489 | 1,560 | -- | 34 | 33,219 |
| Hutchinson, Kansas.. | -- | -- | 26,958 | -- | -- | 2,903 | 29,861 |
| Total..... | 150,641 | 96,384 | 87,848 | 32,227 | 481 | 15,237 | 382,818 |

Grain Transportation Statistics for the North Central Region, table 34 (17).

Country elevators reported shipments to 196 markets of first destination in the North Central Region. Figure 26 summarizes rail and truck movements to these markets.

The total nongovernment grain shipped from country elevators in the North Central Region to known markets of first destination by rail, truck, and barge amounted to over 1.74 billion bushels in 1958.

Intra-area shipments, originating and terminating within each of the 20 areas defined in figure 1, amounted to about 743 million bushels or 43 percent of all nongovernment grain shipped from country elevators. Sixty-five percent was shipped by rail and the remaining 35 percent was by truck. No intra-area barge shipments were reported.

Forty-seven percent of the nongovernment grain, or 822 million bushels, was shipped from country elevators to destinations outside the originating area, but within the North Central Region. Rail shipments were about 677 million bushels, or 82 percent of the movement, truck shipments were about 17 percent, and barges, less than 1 percent.

Of the total shipments from country elevators to known destinations in the North Central Region, 69 percent were shipped by rail, 30 percent by truck, and 1 percent by barge.

Interregional Movements

The mode of transporting grain to other regions in the United States is usually determined by the comparative charges between given origins and destinations, but as this report indicates, carrier service also is an important factor (pp. 71-78).

In the following paragraphs, shipments are analyzed in terms of the modes of transport used between general areas within the North Central Region and other regions of the United States. The indicated railroad charges are from published tariffs, and the data are furnished by the Commodity Stabilization Service, United States Department of Agriculture, unless otherwise noted. Carload rail rates in cents per 100 pounds and bargeload rates in cents per ton of 2,000 pounds were converted to cents per bushel. The following weights per bushel were used: Wheat, 60 pounds; corn and sorghums for grain, 56 pounds. Truck rates are from Statistical Bulletin No. 268 (17) and are assumed to be the same for all grains.

Figures 27 and 28 and table 19 show these movements in 1954 and 1958 and reveal significant changes in relative shares of traffic handled by rail, truck, and barge. In 1958, about 176 million bushels of nongovernment grain moved from country elevators in 11 of the North Central States to other regions--the West, Southwest, East, and Southeast--and to Wisconsin. This is 10 percent of the total shipments from country elevators. Rails handled 26 percent of this traffic, trucks, 65 percent, and barges, 9 percent. In 1954, the comparable movement was 169 million bushels with the rail share being 39 percent, the truck share, 58 percent, and barges, 3 percent. There was an overall volume increase, 1958 over 1954, of about 4 percent, and the rail volume declined 30 percent.

The relative rail share in 1958 increased significantly over 1954 between some areas:

1. From 3 to 36 percent from the Western States of the North Central Region to the Southwestern United States;
2. From 20 to 45 percent from the Western States of the North Central Region to the Western United States;
3. From 3 to 20 percent from the Eastern States of the North Central Region to the Southwest; and
4. From 7 to 38 percent from the Central States of the North Central Region to Wisconsin.

NONGOVERNMENT GRAIN RECEIVED BY RAIL AND TRUCK AT MARKETS OF FIRST DESTINATION, NORTH CENTRAL REGION

From Country Elevators

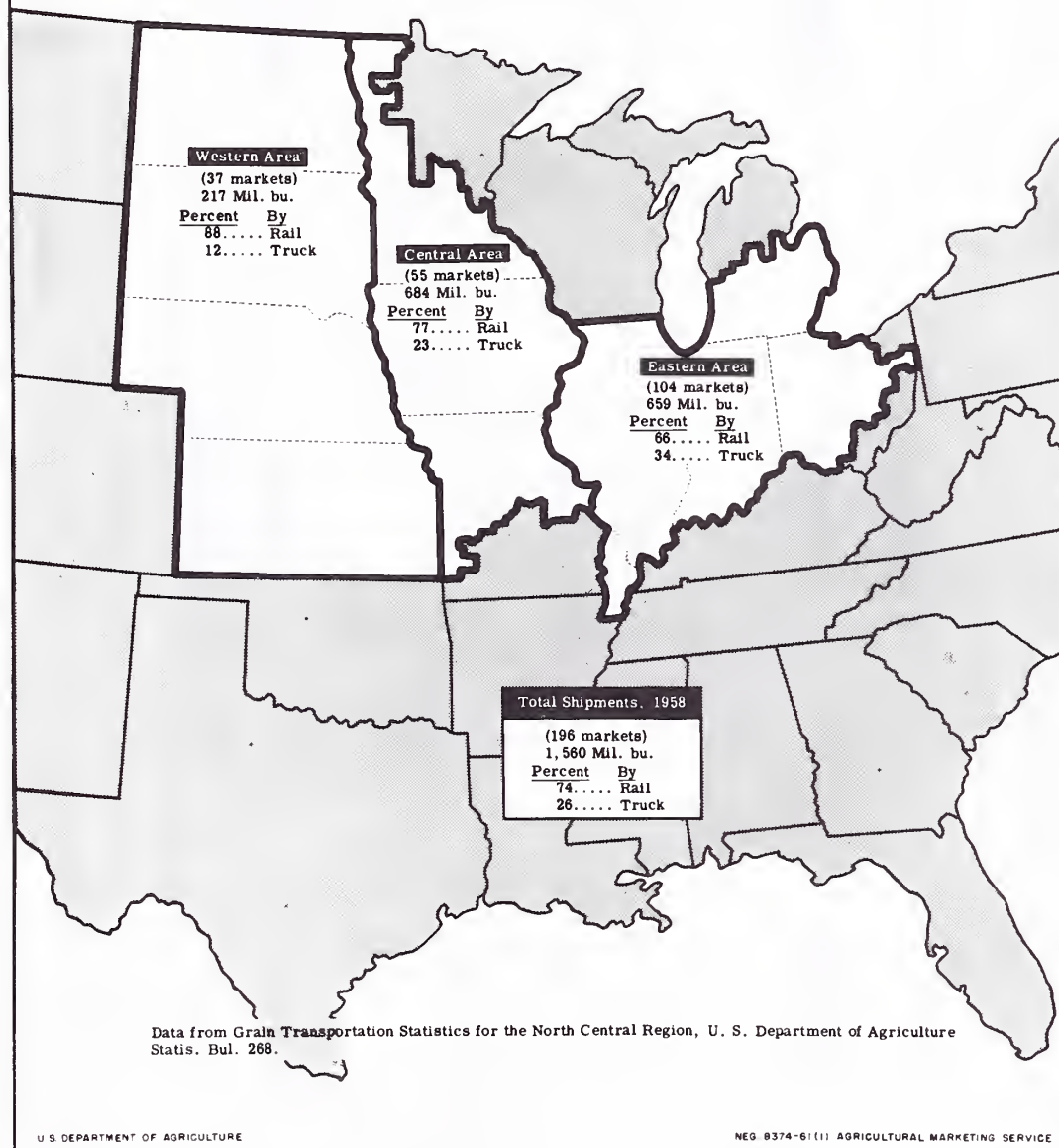
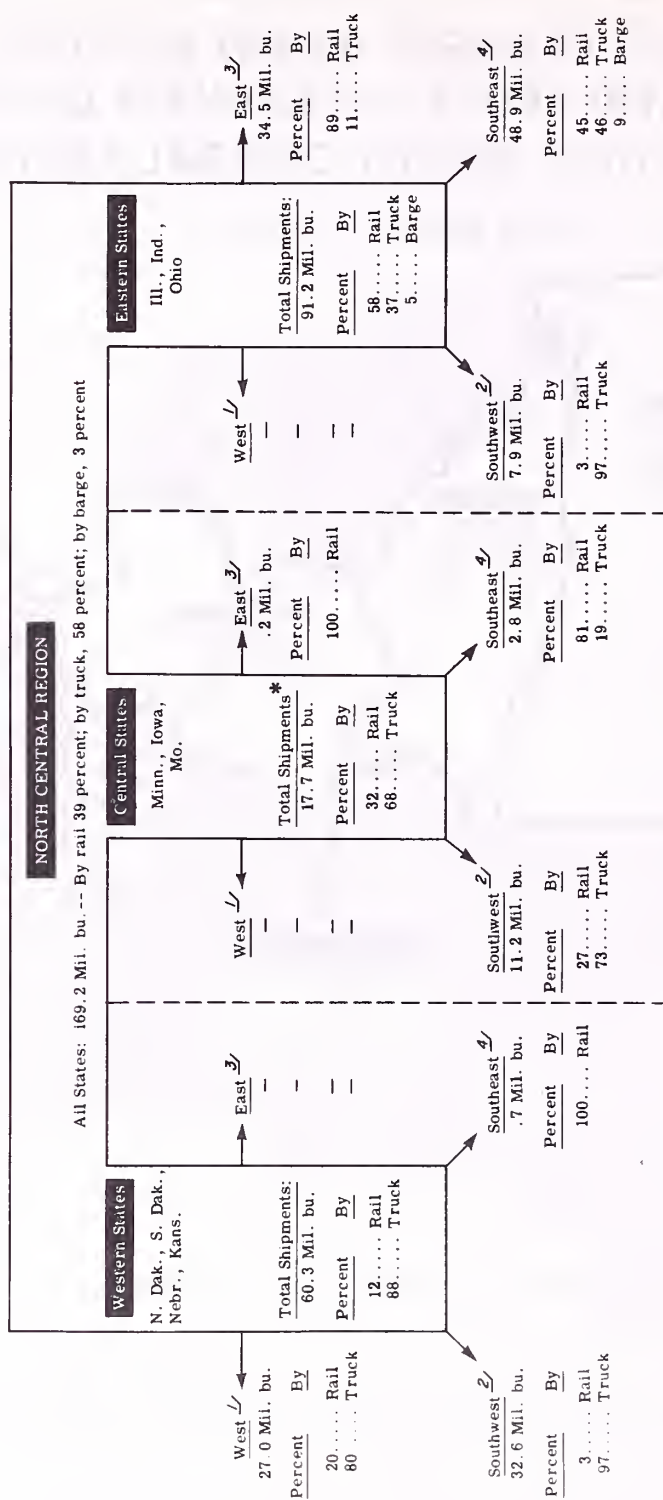


Figure 26

INTERREGIONAL SHIPMENT OF NONGOVERNMENT GRAIN BY COUNTRY ELEVATORS IN NORTH CENTRAL REGION, 1954

By Origin and Destination Areas and Mode of Transport



$\frac{1}{2}$ West: California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

$\frac{2}{3}$ Southwest: Arizona, Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

$\frac{3}{4}$ East: All 6 New England States plus Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Virginia, and West Virginia.

$\frac{4}{3}$ Southeast: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee.

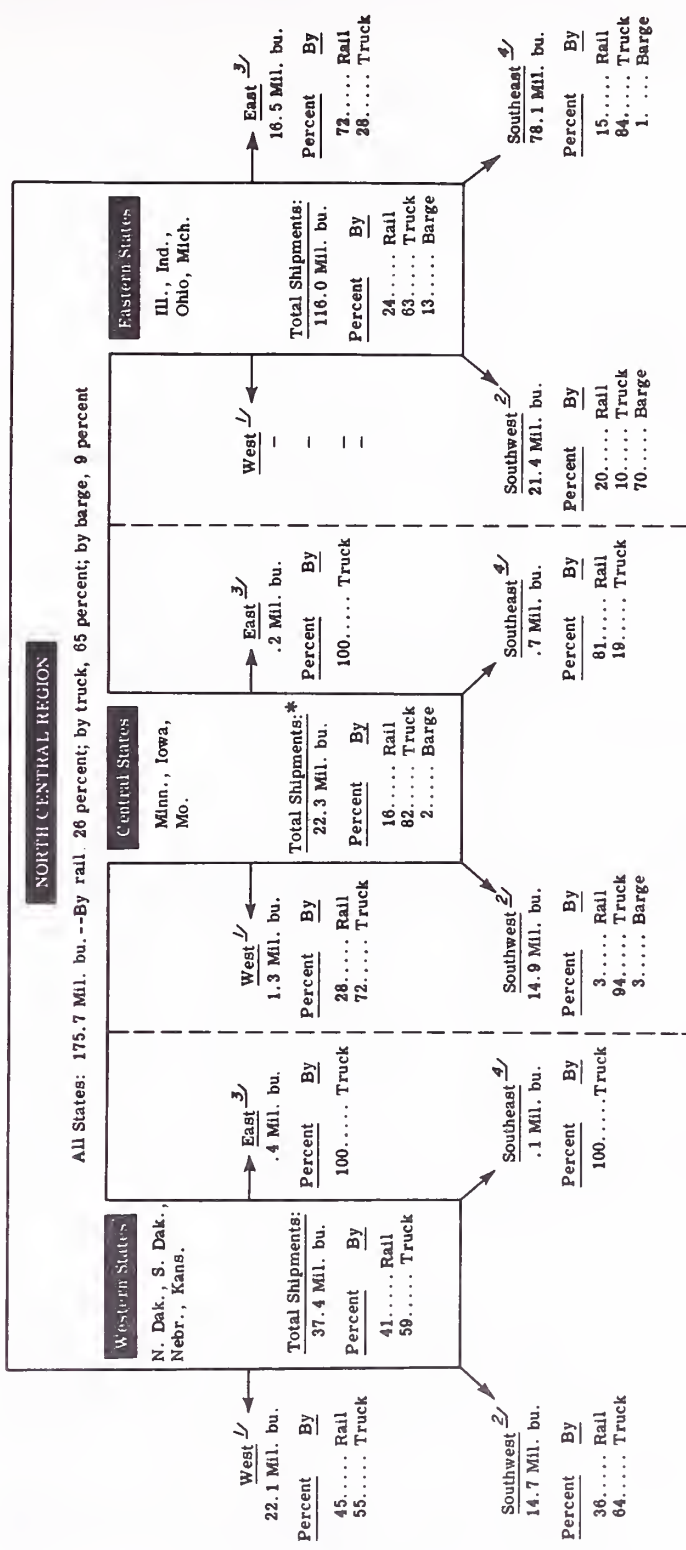
* Includes 3.5 million bushels moving to points in Wisconsin not included in this survey of Grain Transportation in the North Central States, 7 percent moved by rail and 93 percent by truck.

Data from Grain Marketing for the North Central States, Mo. Agr. Expt. Sta., 1958.

Figure 27

INTERREGIONAL SHIPMENT OF NONGOVERNMENT GRAIN BY COUNTRY ELEVATORS IN NORTH CENTRAL REGION, 1958

By Origin and Destination Areas and Mode of Transport



^{1/} West: California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

^{2/} Southwest: Arizona, Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

^{3/} East: All 6 New England States plus Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Virginia, and West Virginia.

^{4/} Southeast: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee.

* Includes 5.2 million bushels moving to points in Wisconsin not included in survey of Grain Transportation in the North Central States. Thirty-eight percent moved by rail and 62 percent by truck.

Data from Grain Transportation Statistics for the North Central Region,
U. S. Department of Agriculture Statis. Bul. 268.

TABLE 19.--Interregional shipments of nongovernment grain from country elevators in North Central Region, by destination, kind of grain, and mode of transport, 1954 and 1958¹

| Destination and kind of grain | 1954 | | | 1958 | | |
|-------------------------------|------------------|----------------|----------------|------------------|----------------|----------------|
| | Total shipments | Percentage | | Total shipments | Percentage | |
| | | Rail | Truck | | Rail | Truck |
| West: | <u>1,000 bu.</u> | <u>Percent</u> | <u>Percent</u> | <u>1,000 bu.</u> | <u>Percent</u> | <u>Percent</u> |
| Corn..... | 18,393 | 10.9 | 89.1 | 15,666 | 30.6 | 69.4 |
| Soybeans..... | 97 | 100.0 | -- | 1,939 | 55.8 | 44.2 |
| Wheat..... | 2,467 | 100.0 | -- | 326 | 66.9 | 33.1 |
| Oats..... | 277 | -- | 100.0 | 247 | -- | 100.0 |
| Barley..... | 303 | 49.5 | 50.5 | 24 | -- | 100.0 |
| Sorghums for grain..... | 5,477 | 14.0 | 86.0 | 5,236 | 80.9 | 19.1 |
| Total..... | 27,014 | 20.3 | 79.7 | 23,428 | 44.1 | 55.9 |
| Southwest: | | | | | | |
| Corn..... | 41,192 | 0.8 | 99.2 | 27,474 | 5.4 | 66.3 |
| Soybeans..... | 1,590 | 86.8 | 13.2 | 8,223 | 43.9 | 13.6 |
| Wheat..... | 2,812 | 90.3 | 9.7 | 6,166 | 13.3 | 19.9 |
| Oats..... | 3,476 | 1.0 | 99.0 | 2,977 | -- | 95.4 |
| Barley..... | 97 | -- | 100.0 | 1,114 | 49.3 | 50.7 |
| Sorghums for grain..... | 2,477 | -- | 100.0 | 5,075 | 68.7 | 31.3 |
| Total..... | 51,644 | 8.3 | 91.7 | 51,029 | 19.5 | 50.1 |
| East: | | | | | | |
| Corn..... | 17,377 | 85.9 | 14.1 | 9,514 | 55.9 | 44.1 |
| Soybeans..... | 1,382 | 16.1 | 83.9 | 503 | 100.0 | -- |
| Wheat..... | 15,418 | 100.0 | -- | 5,771 | 99.8 | 0.2 |
| Oats..... | 472 | 72.9 | 27.1 | 881 | 61.2 | 38.8 |
| Barley..... | -- | -- | -- | -- | -- | -- |
| Sorghums for grain..... | 17 | 100.0 | -- | 432 | -- | 100.0 |
| Total..... | 34,666 | 89.2 | 10.8 | 17,101 | 70.8 | 29.2 |
| Southeast: | | | | | | |
| Corn..... | 34,209 | 32.9 | 55.5 | 60,548 | 3.8 | 95.4 |
| Soybeans..... | 7,710 | 84.7 | 15.3 | 8,562 | 75.1 | 20.9 |
| Wheat..... | 8,407 | 86.1 | 10.6 | 4,474 | 67.2 | 32.8 |
| Oats..... | 2,021 | 5.6 | 94.4 | 4,712 | 0.7 | 99.3 |
| Barley..... | -- | -- | -- | 94 | -- | 100.0 |
| Sorghums for grain..... | -- | -- | -- | 585 | 31.8 | 68.2 |
| Total..... | 52,347 | 48.1 | 43.8 | 78,975 | 15.1 | 83.8 |

¹ Shipments include movement by rail, truck, and barge. Where rail and truck percentage do not total 100, the balance is barge traffic.

Note: Wisconsin was not included among the States surveyed on grain transportation in the North Central Region during 1954 or 1958. The following volume moved from the region to points in this State.

| Grain | 1954 | | | 1958 | | |
|---------------|------------------|----------------|----------------|------------------|----------------|----------------|
| | Volume | Rail | Truck | Volume | Rail | Truck |
| | <u>1,000 bu.</u> | <u>Percent</u> | <u>Percent</u> | <u>1,000 bu.</u> | <u>Percent</u> | <u>Percent</u> |
| Corn..... | 3,404 | 7.8 | 92.2 | 4,365 | 43.4 | 56.6 |
| Soybeans..... | -- | -- | -- | 669 | -- | 100.0 |
| Oats..... | 180 | -- | 100.0 | 190 | 61.6 | 38.4 |
| Total..... | 3,584 | 7.4 | 92.6 | 5,224 | 37.7 | 62.3 |

Grain Marketing Statistics for the North Central States (10), and Grain Transportation Statistics for the North Central Region, table 33 (17).

In contrast, the relative rail share of 1958 nongovernment grain traffic from country elevators has declined substantially from their 1954 share between other areas:

1. From 27 to 3 percent on movements from the Central States of the North Central Region to the Southwestern United States;
2. From 45 to 15 percent on movements from the Eastern States of the North Central Region to the Southeastern United States; and
3. From 89 to 72 percent on movements from the Eastern States of the North Central Region to the Eastern United States.

In addition the rails appear to have lost comparatively small volumes to the trucks on movements from the Western States of the North Central Region to the Southeast and from the Central States to the East.

The analysis indicates that the rails generally have improved their position on grain movements to the West and from the eastern and western States of the North Central Region to the Southwest. They have lost ground in movements to the East and Southeast and from the Central States to the Southwest. Where the rails have shown relative gains, trucks have usually shown relative losses. Where the rails have lost, the trucks or the barges, or both, have gained.

On grain movements from the Eastern States to the Southwest, which includes New Orleans-Baton Rouge, the rails' share of the traffic rose from 3 percent to 20 percent. The trucks' share fell to 10 percent from 97 percent, but the relative barge share jumped from nothing in 1954 to 70 percent in 1958. This reflects the construction on the inland waterways of new elevators that receive most of their grain directly from farmers and thus are classified as country elevators (82).

The changing pattern of grain movement by mode of transport reflects changes in grain production in various areas and grain feeding requirements in areas outside the North Central Region as well as the influence of the commercially navigable inland waterways with low cost barge transportation. Demand for grain for export, as evidenced at the several port areas, also is a factor in this changing pattern.

To Western and Southwestern Regions. --The West generally is a deficit area for feed grain, and the requirements of this area are supplied for the most part from States in the western area of the North Central Region. These are North Dakota, South Dakota, Nebraska, and Kansas. The east-to-west movement of general commodities exceeds the west-to-east movement. In recent years, trucks have increased their share of this traffic. Much grain moves as backhaul from west to east in regulated motor carriers, and the rates charged are exempt from Interstate Commerce Commission regulation. In contrast, a substantial part of the westbound movement of nongovernment feed grains from country elevators in the Dakotas, Nebraska, and Kansas is handled by merchant truckers and private or leased trucks at unregulated charges (figs. 14 and 15). Since the grain is a backhaul movement, truck rates are comparatively low (table 20).

In 1958 country elevators in the western area of the North Central Region shipped over 22 million bushels of nongovernment grain to the western United States, 55 percent of which moved by truck and 45 percent by rail (fig. 28). The principal movements were about 14 million bushels of corn from Nebraska, 69 percent by truck; 5 million bushels of sorghums for grain from Kansas and Nebraska, 19 percent by truck; and about 2 million bushels of soybeans from Nebraska, Kansas, and North Dakota, 41 percent by truck. A comparatively small volume of nongovernment grain moves from country elevators in Minnesota, Iowa, and Missouri to the West, mostly by truck. No volume was reported as moving to the West from country elevators east of the Mississippi River and north of the Ohio River.

TABLE 20.--Truck and rail rates, per bushel, for transporting corn and sorghums for grain to Denver, Colo., from selected origins, October 1, 1958

| Origin | Truck | Rail |
|----------------------------|--------------|--------------|
| | <u>Cents</u> | <u>Cents</u> |
| Oshkosh, Nebr..... | 12.2 | 20.4 |
| Hays, Kans..... | 18.1 | 21.6 |
| Dodge City, Kans..... | 18.7 | 23.0 |
| Kearney, Nebr..... | 18.8 | 25.8 |
| Rapid City, S. Dakota..... | 20.4 | 33.3 |
| Pierre, S. Dakota..... | 25.9 | 56.0 |

Grain Transportation Statistics for the North Central Region, table 53 (17).

Except for the heavy production of sorghums for grain in the Southwest, requirements for feed grains are met by imports from the North Central Region. The Gulf Coast ports also attract feed grains for export. In 1958, about 51 million bushels of nongovernment grain moved to the Southwest from country elevators in the North Central Region (fig. 28). The movement was 50 percent by truck and 30 percent by barge; rail movement was less than 20 percent of the total volume. Of the 35.5 million bushels moving by rail and truck, 28 percent moved by rail. Practically all of the barge volume was to New Orleans-Baton Rouge for export and came from country elevators along the Illinois and Upper Mississippi Rivers. It is a comparatively small part of the total movement to these ports since most of the barge grain originated at terminal and subterminal elevators. Table 21 indicates comparative published rail and barge export rates.

TABLE 21.--Rail and barge rates, per bushel, for corn transported from selected origins, to New Orleans, La., for export, October 1, 1958

| Origin | Rail | Barge |
|------------------------|--------------|--------------|
| | <u>Cents</u> | <u>Cents</u> |
| St. Louis, Mo..... | 14.6 | 8.4 |
| Louisville, Ky..... | 14.6 | 17.0 |
| Kansas City, Mo..... | 25.5 | 13.3 |
| Peoria, Ill..... | 20.7 | 10.2 |
| Omaha, Nebr..... | 27.4 | 15.2 |
| Minneapolis, Minn..... | 33.9 | 15.2 |

Grain Transportation Statistics for the North Central Region, table 54 (17).

From all the listed ports, except Louisville, published barge rates are lower than applicable rail rates. However, much grain moved by barge under the bulk exemption, and the rates charged probably are somewhat below published charges. Too, shippers are resorting increasingly to moving grain in their own barges, both to guarantee they have barge equipment when needed and to cut transportation costs.

Texas ports also receive heavy volumes of North Central grain for export, particularly from Kansas. Comparative rail and truck rates are given in table 22.

Table 23 gives domestic charges for the movement of grain from selected North Central origins to southwestern destinations by rail and truck.

TABLE 22.--Rail and truck rates, per bushel, for sorghums for grain and wheat transported from selected origins to Houston, Tex., for export, October 1, 1958

| Origin | Truck | Rail | |
|-----------------------|--------------|--------------------|--------------|
| | | Sorghums for grain | Wheat |
| | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> |
| Wichita, Kans..... | 30.6 | 33.0 | 37.8 |
| Springfield, Mo..... | 31.8 | 30.8 | 38.1 |
| Dodge City, Kans..... | 34.1 | 40.6 | 48.6 |
| Kansas City, Mo..... | 35.6 | 23.0 | 27.3 |

Grain Transportation Statistics for the North Central Region, table 53 (17).

TABLE 23.--Rail and truck rates, per bushel, for corn and wheat transported from selected markets in the North Central Region to the Southwest for domestic use, October 1, 1958

| Origin | Enid, Okla. | | | Ft. Worth, Tex. | | | Little Rock, Ark. | | |
|-----------------------|--------------|--------------|--------------|-----------------|--------------|--------------|-------------------|--------------|--------------|
| | Truck | Rail | | Truck | Rail | | Truck | Rail | |
| | | Corn | Wheat | | Corn | Wheat | | Corn | Wheat |
| | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> |
| Wichita, Kans..... | 7.2 | 14.0 | 20.1 | 19.6 | 28.0 | 40.2 | -- | -- | -- |
| Dodge City, Kans..... | 11.8 | 19.6 | 28.5 | 22.5 | 35.3 | 50.7 | -- | -- | -- |
| Springfield, Mo..... | 16.5 | 23.0 | 33.0 | 22.9 | 25.8 | 37.2 | -- | -- | -- |
| Nevada, Mo..... | -- | -- | -- | -- | -- | -- | 17.2 | 20.7 | 33.9 |
| St. Louis, Mo..... | -- | -- | -- | -- | -- | -- | 18.7 | 22.1 | 29.4 |
| Lexington, Mo..... | -- | -- | -- | -- | -- | -- | 20.1 | 20.7 | 35.1 |
| Des Moines, Ia..... | -- | -- | -- | -- | -- | -- | 28.1 | 26.6 | 43.2 |

Grain Transportation Statistics for the North Central Region, table 53 (17).

The rates for the movement of corn and sorghums for grain are the same. Truck rates to Enid and Fort Worth for the designated grains are well under comparable rail charges. Rail rates for feed grains to Little Rock are competitive with truck rates. Arkansas is a heavy broiler-producing State, requiring large volumes of feed grains from States in the North Central Region. Country elevators in the Western States of the North Central Region in 1958 shipped about 15 million bushels of grain to the Southwest, 64 percent by truck and 36 percent by rail (fig. 28). The principal movements included 6 million bushels of corn from Nebraska, South Dakota, and Kansas, of which 87 percent moved by truck; 4.5 million bushels of sorghums for grain from Kansas, 77 percent by rail; somewhat less than 2 million bushels of wheat from Kansas, 73 percent by truck; and slightly over 1 million bushels of oats from the Dakotas, all by truck.

The Central States of the North Central Region provided about 15 million bushels of nongovernment grain from country elevators for the Southwest market in 1958, 94 percent by truck, 3 percent by rail and 3 percent by barge (fig. 28). The principal movements included about 12 million bushels of corn from Missouri, Minnesota, and Iowa, 96 percent by truck; slightly less than 2 million bushels of oats, largely from Iowa, by truck; less than a million bushels of soybeans, again largely from Iowa, by truck.

Country elevators in the Eastern States of the North Central Region shipped over 21 million bushels of nongovernment grain into the Southwest, 70 percent by barge, 20 percent by rail, and 10 percent by truck (fig. 28). The barge movement originated entirely from country elevators in Illinois and aggregated over 15 million bushels of grain, 51 percent corn, 23 percent soybeans, 25 percent wheat, and the balance oats. Of the more than 6 million bushels of grain moving by rail and truck, about 4 million bushels were soybeans and 2 million bushels were corn; 91 percent of the soybeans moved by rail, and 83 percent of the corn moved by truck. The soybeans and most of the corn originated in the area Missouri-Illinois-Indiana, south, all of which, for purposes of this analysis, was included in the eastern area of the North Central Region. Actually, a large proportion of the soybeans and corn were shipped from country elevators in southeastern Missouri.

Table 24 compares the production of corn and sorghums for grain for an 8-year period in the States receiving heavy volumes of feed grains from the North Central Region. Production of corn in Colorado doubled in the 1953 to 1958 period and production of sorghums expanded by almost seven times. In the Southwestern States of Arkansas, Oklahoma, Texas, and New Mexico, production of corn and sorghums jumped from around 118 million bushels in 1953 to over 371 million bushels in 1958. Except for the drought year 1956, production increased each year.

Total movements of nongovernment feed grains (corn, sorghums, oats, barley, and soybeans) from country elevators in the North Central Region to the West declined slightly from 1954 to 1958 (table 19). At the Kansas City and Omaha markets, receipts of nongovernment feed grains from country elevators increased from over 69 million bushels in 1954 to 103 million bushels in 1958. The increased movements from country elevators to these terminals in 1958 and the greatly expanded production of feed grains in Colorado--a leading destination in the West for feed grains from the North Central Region--account for the decreased volume of nongovernment grain shipments direct from country elevators to the West.

Receipts of nongovernment feed grain at the St. Louis, Kansas City, and Omaha markets from country elevators increased from 99.5 million bushels in 1954 to more than 152 million bushels in 1958. Total receipts of nongovernment feed grains in the Southwest from country elevators in the North Central Region declined 8 percent from 1954 to 1958, but corn receipts declined about 14 million bushels, or one-third in the same period (table 19). Much of this decline is attributable to the 180-million-bushel increase in production of corn and sorghums in the Southwest from 1954 to 1958 (table 24), as well as the substantial increase in feed grain receipts at terminal markets in the North Central Region that draw grain from country elevators in the Western and Central States of the North Central Region. The 13.5-million-bushel increase in nongovernment grain receipts in the Southwest from country elevators in Eastern States of the North Central Region from 1954 to 1958 is accounted for almost entirely by barge shipments to New Orleans-Baton Rouge (figs. 27 and 28).

Late in 1957, rail rates on corn and sorghums were substantially reduced from selected Kansas and Missouri origins to Oklahoma and Texas destinations. Where the rail rate on corn or grain sorghums had been 28.5 cents per hundred pounds in 1954, the rate was 24 cents in 1958; where it had been 36 cents in 1954, the 1958 rate was 32 cents. "In 1958 Western Trunk Line railroads reduced their local or gathering rates on major feed grains (based on the WTL 21-4800 scale) from country points in the Western States of the North Central Region into selected markets." The reduced rates generally applied up to 300 miles from the markets. These rate adjustments increased the railroads' share of direct grain shipments from country elevators into the Southwest, although total rail and truck volume declined because of the greatly expanded production of sorghums in the Southwest.

Arkansas, with its expanded broiler industry, is an important market for feed grains from the Central States of the North Central Region. The decreased rail share of the grain traffic from these States, 1958 compared to 1954 (figs. 27 and 28), reflects both the increased production of feed grains in Arkansas and the increased sorghum production

TABLE 24.--Production of corn and sorghums for grain in selected regions and States, 1953-60

| Region or State and grain | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 ¹ |
|------------------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|
| West: | | | | | | | | |
| Colorado: | | | | | | | | |
| Corn..... | 12,832 | 11,745 | 17,064 | 17,340 | 26,500 | 25,725 | 26,182 | 23,850 |
| Sorghums for grain..... | 1,890 | 4,158 | 4,950 | 2,562 | 16,400 | 12,450 | 9,292 | 7,344 |
| Total..... | 14,722 | 15,903 | 22,014 | 19,902 | 42,900 | 38,175 | 35,474 | 31,194 |
| Southwest: | | | | | | | | |
| Arkansas: | | | | | | | | |
| Corn..... | 11,849 | 8,019 | 19,558 | 18,090 | 13,932 | 14,688 | 14,945 | 11,799 |
| Sorghums for grain..... | 308 | 270 | 1,564 | 1,738 | 4,187 | 3,286 | 1,372 | 780 |
| Oklahoma: | | | | | | | | |
| Corn..... | 6,412 | 3,370 | 8,112 | 5,296 | 4,914 | 9,000 | 8,316 | 8,547 |
| Sorghums for grain..... | 7,662 | 6,447 | 14,404 | 6,164 | 15,213 | 18,460 | 18,792 | 23,168 |
| Texas: | | | | | | | | |
| Corn..... | 33,874 | 32,572 | 48,288 | 27,465 | 40,020 | 42,973 | 42,728 | 29,876 |
| Sorghums for grain..... | 55,198 | 135,630 | 148,309 | 124,202 | 238,095 | 273,066 | 277,666 | 277,680 |
| New Mexico: | | | | | | | | |
| Corn..... | 1,275 | 1,000 | 1,092 | 1,334 | 1,560 | 1,457 | 1,584 | 1,848 |
| Sorghums for grain..... | 1,378 | 4,636 | 5,550 | 3,488 | 6,590 | 8,085 | 8,474 | 9,080 |
| Total..... | 117,956 | 191,944 | 246,877 | 187,777 | 324,511 | 371,015 | 373,877 | 362,778 |
| East ² | 148,078 | 168,258 | 160,933 | 195,995 | 134,268 | 203,885 | 195,369 | 204,868 |
| Southeast ³ | 192,284 | 130,614 | 247,679 | 219,245 | 216,720 | 265,274 | 256,280 | 243,206 |

¹ Preliminary data.² Includes New York, New Jersey, Pennsylvania, Delaware, Maryland, and Virginia.³ Includes Tennessee, Alabama, Mississippi, and Georgia.

Agricultural Statistics, 1955-59, U.S. Dept. Agr. (66), and Crop Production, 1959-60 annual summaries, Crop Reporting Board, AMS, U.S. Dept. Agr. (64).

in Kansas and Oklahoma (tables 1 and 24). Elevator operators in Missouri and Kansas advised that grain grown in Oklahoma and Kansas moved in increasingly greater volumes into Arkansas during this 5-year period. Rail rate adjustments through 1958 had not affected the substantial truck movement into western Arkansas where broiler production is heaviest. Truck movement of nongovernment grain from country elevators in the North Central Region to areas outside the region is shown in table 25 for 1954, 1956, and 1958. The marked downward trend in truck shipments into the West and Southwest coincides with the greatly expanded production of corn and sorghums in those areas (table 24).

TABLE 25.--Interregional shipments of nongovernment grain by truck from country elevators in the North Central Region, by areas of origin and destination, and corn as a percentage of total truck shipments, 1954, 1956, and 1958

| Destination and origin of shipments | 1954 | | 1956 | | 1958 | |
|---|------------|----------------------------------|------------|----------------------------------|----------------------|----------------------------------|
| | All grains | Corn as percentage of all grains | All grains | Corn as percentage of all grains | All grains | Corn as percentage of all grains |
| To Western United States from-- | 1,000 bu. | Percent | 1,000 bu. | Percent | 1,000 bu. | Percent |
| Western North Central States..... | 21,250 | -- | 14,331 | -- | 12,185 | -- |
| Central North Central States..... | -- | -- | 481 | -- | 925 | -- |
| Total..... | 21,250 | 76.1 | 14,812 | 61.1 | 13,110 | 82.9 |
| To Southwestern United States from-- | | | | | | |
| Western North Central States..... | 31,523 | -- | 11,007 | -- | 9,459 | -- |
| Central North Central States ¹ | 8,216 | -- | 12,347 | -- | 15,127 | -- |
| Eastern North Central States..... | 7,604 | -- | 4,202 | -- | 964 | -- |
| Total..... | 47,343 | 86.3 | 27,556 | 58.6 | 25,550 | 71.3 |
| To Eastern United States from-- | | | | | | |
| Western North Central States..... | -- | -- | -- | -- | 432 | -- |
| Eastern North Central States..... | 3,744 | 65.6 | 6,068 | -- | 4,552 | -- |
| Total..... | 3,744 | 65.6 | 6,068 | 84.2 | 4,984 | 84.2 |
| To Southeastern United States from-- | | | | | | |
| Western North Central States..... | -- | -- | -- | -- | 115 | -- |
| Central North Central States..... | 523 | -- | 3,917 | -- | 2,157 | -- |
| Eastern North Central States..... | 22,419 | -- | 36,431 | -- | 63,919 | -- |
| Total..... | 22,942 | 82.7 | 40,348 | 83.8 | 66,191 | 87.3 |
| All | | | | | | |
| Western North Central States..... | 53,043 | -- | 25,338 | -- | 22,191 | -- |
| Central North Central States..... | 8,739 | -- | 16,745 | -- | 18,209 | -- |
| Eastern North Central States..... | 33,767 | -- | 46,701 | -- | 69,435 | -- |
| Total..... | 95,549 | 82.3 | 88,784 | 72.2 | ² 109,835 | 82.9 |

¹ Southeastern Missouri, although part of grain traffic area XVII (see figure 1), is included to enable direct comparison with 1954 and 1956 data.

² Shipments to Wisconsin excluded.

Data for 1954 from Grain Marketing Statistics for the North Central States, (10); 1956 data from Truck Shipments of Grain in the North Central Region, 1956 (36); 1958 from Grain Transportation Statistics for the North Central Region, table 33 (17).

To Eastern Region. --The Eastern States generally are regarded as deficit areas for feed grain, and the North Atlantic ports are heavy exporters of grain, much of it originating in the North Central Region. Flour and feed manufacture is extensive in the East. While the major movement of grain from the North Central Region to the East is from terminal elevators, the volume of nongovernment grain shipped by country elevators is substantial. Most of the volume is moved from Ohio, principally by rail. While the truck volume is not large, it is significant and is growing. This study shows that country elevators in Ohio rely heavily on common or contract truckers, which move the grain as backhaul (figs. 14 and 15). Table 26 gives comparative rail and truck rates to Baltimore, Md., for grain for export.

Comparative truck and rail rates indicate that trucks may have moved some grain for export in 1958. However, since the export elevators at Baltimore receive grain predominantly by rail and are owned by the railroads, probably little, if any, trucked grain moved from country elevators in the North Central Region in 1958 for export from Baltimore. Elevators at Norfolk and Philadelphia are equipped to receive grain by truck, and the comparative rates also are representative for these ports.

TABLE 26.--Rail and truck rates, per bushel, for corn and wheat shipped from selected markets in the North Central Region to Baltimore, Md., for export, October 1, 1958

| Origin | Truck | Rail ¹ | |
|-----------------------|--------------|-------------------|--------------|
| | | Corn | Wheat |
| | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> |
| Ft. Wayne, Ind..... | 27.1 | 25.8 | 27.6 |
| Cincinnati, Ohio..... | 26.2 | 25.8 | 27.6 |
| Cleveland, Ohio..... | 19.5 | 25.8 | 27.6 |
| Lima, Ohio..... | 25.6 | 25.8 | 27.6 |

¹ Rates obtained from letter from Board of Trade of the City of Chicago to Harold D. McCoy, Secretary, Interstate Commerce Commission, May 27, 1959: Protest and Petition for Suspension [of Supp. 133 to H. R. Hinsch's Tariff 245-H, ICC No. 4403] pp. 15-18.

Delaware, Maryland, and Virginia have extensive broiler production and are deficit in feed for animals and poultry. Most of the nongovernment grain moving by truck from country elevators in the Eastern States of the North Central Region to the East probably goes into feed. Table 27 provides comparative domestic rail and truck rates to the East.

The comparative domestic rates indicate the trucks' advantage. Although about 600,000 bushels of nongovernment grain moved by truck from country elevators in States of the North Central Region west of the Mississippi River to the East, the predominant movement was from Indiana, Michigan, and Ohio.

In 1958, country elevators in the Eastern States of the North Central Region shipped 16.5 million bushels of nongovernment grain to the East, 72 percent of which moved by rail and 28 percent by truck (fig. 28). The principal movements were: Over 9 million bushels of corn, about 6 million bushels of wheat, about 600,000 bushels of oats, and a half million bushels of soybeans. The corn was shipped principally from Michigan, Indiana, and Ohio; 55 percent was shipped by rail and 45 percent by truck; movement from the East Michigan-North Ohio area was mostly by truck. Almost all the wheat was shipped from Ohio by rail.

TABLE 27.--Rail and truck rates, per bushel, for corn and wheat shipped from selected markets in the North Central Region to eastern markets for domestic use, October 1, 1958

| Origin | To Richmond, Va. | | | To Salisbury, Md. | | |
|------------------------|------------------|--------------|--------------|-------------------|--------------|--------------|
| | Truck | Rail | | Truck | Rail | |
| | | Corn | Wheat | | Corn | Wheat |
| | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> |
| Columbus, Ohio..... | 24.6 | 28.3 | 30.3 | 26.4 | 32.8 | 35.1 |
| Indianapolis, Ind..... | 31.3 | 33.3 | 35.7 | 33.8 | 37.5 | 40.2 |
| Decatur, Ill..... | 37.6 | 43.7 | 46.8 | 40.1 | 47.9 | 51.3 |

Grain Transportation Statistics for the North Central Region, table 55 (17).

The decreasing volume of nongovernment grain moving into the East from country elevators in the North Central Region reflects the greatly expanded production of corn in the East (table 24 and figs. 27 and 28). Annual production of corn and sorghums in the East advanced from around 150 million to over 200 million bushels during the 1953-58 period. Total shipments from the North Central Region of all grains declined 50 percent between 1954 and 1958. Corn shipments declined over 45 percent. Wheat shipments declined about 10 million bushels, or 63 percent. Truck shipments from country elevators increased from about 11 to over 29 percent of total nongovernment grain shipments; rail shipments of corn dropped 30 percent. The railroads continued to handle nearly all of the wheat movement. Through 1958, the eastern railroads had made no rate adjustments to meet the increased truck competition. Private or leased trucks, the regulated truckers, and merchant truckers shared in the truck volume (figs. 14 and 15). Heavy truck movements of general commodities from Pennsylvania and other Eastern States into the Eastern States of the North Central Region provide transportation for eastbound grain.

Table 28 indicates the decreasing importance of the Atlantic ports in the handling of export grain. Although relatively little, if any, of the nongovernment grain trucked from country elevators in the North Central Region moves through these ports, the export market competes with the domestic market for grain and influences country elevator shipments. Perhaps the greatest causes of the decline in domestic and export rail shipments to the East have been the increases in rail rates since World War II and the availability of low-cost barge transportation to Gulf outlets. The rate increases stimulated eastern grain production and processing and diverted grain traffic to trucks. Of the total Atlantic, Gulf, and Great Lakes grain exports, the Atlantic ports' share declined from about 44 percent in 1954 to less than 18 percent in 1958 (table 28). The Atlantic ports' share declined further in 1959 (see discussion in later section, p. 100).

To Southeastern Region. -- Although grain production in the Southeast has been expanding in recent years, it has not kept pace with the rapidly increasing requirements of broiler, dairy, and livestock production. Thus, the Southeast draws substantial supplies of feed grain from the North Central Region, and receives large volumes of grain by barge from terminal and subterminal markets along the inland waterways in the North Central Region. Most of the elevators on the Tennessee River are owned by companies that have terminal or subterminal elevators on other commercially navigable waterways in the North Central Region. This grain is unloaded principally at Memphis and at the several ports and processing centers along the Tennessee River. Country elevators in the Eastern States of the North Central Region ship large volumes of nongovernment grain by truck into the Southeast (fig. 28).

TABLE 28.--Grains inspected for export, by port area, calendar years 1954, 1956, 1958, and 1959

| Port area and kind of grain | 1954 | 1956 | 1958 | 1959 |
|-----------------------------|------------------|------------------|------------------|------------------|
| | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> | <u>1,000 bu.</u> |
| Atlantic: | | | | |
| Corn..... | 35,298 | 66,344 | 45,590 | 51,071 |
| Soybeans..... | 13,877 | 14,648 | 14,742 | 19,643 |
| Wheat..... | 87,016 | 148,549 | 82,566 | 88,064 |
| Oats..... | 639 | 19,052 | 13,155 | 6,180 |
| Barley..... | 3,414 | 18,108 | 22,471 | 2,600 |
| Sorghum for grain..... | -- | -- | -- | -- |
| Other..... | 4,759 | 11,087 | 3,753 | 49 |
| Subtotal..... | 145,003 | 277,788 | 182,277 | 167,607 |
| Gulf: | | | | |
| Corn..... | 23,741 | 28,637 | 93,842 | 125,900 |
| Soybeans..... | 23,327 | 45,873 | 59,317 | 85,701 |
| Wheat..... | 53,222 | 128,720 | 160,454 | 164,017 |
| Oats..... | 399 | 12,035 | 9,059 | 7,695 |
| Barley..... | 785 | 7,368 | 25,206 | 23,308 |
| Sorghum for grain..... | 17,104 | 56,077 | 72,713 | 101,289 |
| Other..... | 960 | 6,587 | 2,013 | 2,488 |
| Subtotal..... | 119,538 | 285,297 | 422,604 | 510,398 |
| Pacific: | | | | |
| Corn..... | -- | 9,928 | 4,095 | 226 |
| Soybeans..... | -- | -- | -- | -- |
| Wheat..... | 49,383 | 124,509 | 87,986 | 91,687 |
| Oats..... | -- | 1,128 | 2,119 | 78 |
| Barley..... | 15,909 | 55,783 | 73,173 | 60,481 |
| Sorghum for grain..... | -- | 56 | 2,364 | -- |
| Other..... | 19 | 256 | 1,577 | 3,763 |
| Subtotal..... | 65,311 | 191,660 | 171,314 | 156,235 |
| Great Lakes: | | | | |
| Corn..... | -- | 3,921 | 15,667 | 42,536 |
| Soybeans..... | -- | 7,510 | 9,449 | 18,369 |
| Wheat..... | -- | -- | 35 | 12,649 |
| Oats..... | -- | -- | -- | 31,942 |
| Barley..... | -- | -- | 194 | 25,106 |
| Sorghum for grain..... | -- | -- | -- | -- |
| Other..... | -- | 292 | 4,624 | 7,768 |
| Subtotal..... | -- | 11,723 | 29,969 | 138,370 |
| All port areas..... | 329,852 | 766,468 | 806,164 | 972,610 |

Grain Division, Agricultural Marketing Service, U. S. Dept. Agr.

The Southeastern States ship fruits, vegetables, and poultry to the North Central Region, much of it by truck. These trucks use grain as a backhaul, and the merchant trucker plays a significant part in this movement, along with private and leased trucks (figs. 14 and 15). Table 29 compares applicable truck and rail rates, as well as combination rates where the several modes of transport are used, from selected origins in the North Central Region to representative markets in the Southeast. Grain transfer charges for barge loading and unloading are included, as applicable (16).

TABLE 29.--Domestic charges, per bushel, for moving corn and wheat from selected origins in the North Central Region to markets in the Southeast, by selected modes of transport, October 1, 1958

| Market and origin | Truck | Rail | | Barge-rail or truck-barge-rail | |
|-------------------------------|--------------|--------------|--------------|--------------------------------|--------------|
| | | Corn | Wheat | Corn | Wheat |
| | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> |
| To Selma, Ala., from-- | | | | | |
| Columbus, Ohio..... | 34.4 | 50.7 | 55.5 | 46.1 | 52.6 |
| Decatur, Ill..... | 32.1 | 48.7 | 53.7 | 42.6 | 49.3 |
| Des Moines, Ia..... | -- | 57.7 | 63.3 | 46.2 | 52.8 |
| Indianapolis, Ind..... | 30.2 | 45.4 | 50.1 | 42.0 | 48.7 |
| Kansas City, Mo..... | 38.0 | 44.4 | 47.4 | 35.4 | 42.3 |
| Lincoln, Nebr..... | -- | 61.9 | 67.8 | 45.3 | 52.2 |
| Mankato, Minn..... | -- | 63.3 | 74.7 | 46.5 | 53.4 |
| Minneapolis, Minn..... | -- | 56.3 | 61.8 | 36.7 | 43.6 |
| Omaha, Nebr..... | -- | 50.4 | 55.5 | 37.3 | 44.2 |
| Peoria, Ill..... | 35.2 | 48.7 | 53.7 | 33.6 | 40.3 |
| St. Louis, Mo..... | 29.2 | 30.0 | 32.1 | 29.6 | 36.0 |
| Terre Haute, Ind..... | 29.6 | 46.8 | 51.6 | 43.9 | 50.4 |
| Wichita, Kans..... | -- | 66.9 | 73.2 | 50.6 | 57.5 |
| To Gainesville, Ga., from-- | | | | | |
| Columbus, Ohio..... | 28.8 | 48.4 | 57.0 | 48.6 | 56.5 |
| Decatur, Ill..... | 30.3 | 51.0 | 60.0 | 45.1 | 53.2 |
| Des Moines, Ia..... | -- | 59.9 | 69.6 | 48.7 | 56.7 |
| Indianapolis, Ind..... | 27.6 | 47.9 | 56.4 | 44.7 | 52.6 |
| Kansas City, Mo..... | 40.0 | 50.1 | 53.7 | 37.9 | 46.2 |
| Lincoln, Nebr..... | -- | 64.1 | 74.1 | 47.8 | 56.1 |
| Mankato, Minn..... | -- | 65.5 | 81.0 | 49.0 | 57.3 |
| Minneapolis, Minn..... | -- | 58.5 | 68.1 | 39.2 | 47.5 |
| Omaha, Nebr..... | -- | 52.6 | 61.8 | 39.8 | 48.1 |
| Peoria, Ill..... | 33.6 | 51.0 | 60.0 | 36.1 | 44.2 |
| St. Louis, Mo..... | 30.0 | 35.8 | 38.4 | 32.1 | 39.9 |
| Terre Haute, Ind..... | 27.2 | 49.3 | 57.9 | 46.4 | 54.3 |
| Wichita, Kans..... | -- | 69.2 | 79.5 | 53.1 | 61.4 |
| To Rocky Mount, N. C., from-- | | | | | |
| Columbus, Ohio..... | 28.0 | 51.8 | 55.5 | -- | -- |
| Indianapolis, Ind..... | 33.8 | 43.1 | 48.3 | -- | -- |
| Decatur, Ill..... | 40.1 | 49.8 | 54.6 | -- | -- |

Grain Transportation Statistics for the North Central Region, table 55 (17).

Table 29 shows that between the listed origins and destinations truck rates or combination rates using barge transport are lower than all-rail rates for both corn and wheat. Truck rates are particularly advantageous from Ohio and Indiana origins, and combination rates using barge are lower than all-rail rates for the greater distances from markets in the Western and Central States of the North Central Region.

In 1958, country elevators in the Western and Central States of the North Central Region shipped less than 1 million bushels of nongovernment grain to the Southeast, predominantly by rail (fig. 28). Country elevators in the Eastern States of the North Central Region shipped over 78 million bushels of nongovernment grain to the Southeast in 1958; 84 percent of this grain moved by truck, 15 percent by rail, and 1 percent by barge. Over 60 million bushels of corn were shipped to the Southeast, largely from Illinois but with significant volumes from Indiana and Ohio. Trucks moved over 95 percent of the corn. Soybean volume was over 8 million bushels; the rails moved about 78 percent, trucks 22 percent. The principal source of soybeans was the area Missouri-Illinois-Indiana, south, with a heavy volume from southeastern Missouri. About 5 million bushels of oats moved into the Southeast, all by truck, largely from Illinois. Wheat volume was 4 million bushels, largely from southern Illinois and Indiana; about 64 percent moved by rail and 36 percent by truck. Small volumes of barley and sorghums for grain moved by truck. Country elevator shipments of nongovernment grain by barge to the Southeast totaled 850,000 bushels, all from Illinois.

The Southeastern States include Kentucky and the markets on the south bank of the Ohio River. It is estimated that 55 to 60 million bushels of grain were trucked from north of the Ohio River to points south of the Ohio River (81). The 1958 movement to that area may have been unusually high, because of a short crop in some of the Southeastern States in 1957.

The greatly increased production of corn in the Southeast since 1953 (table 24) has not kept pace with the expanded feed requirements, as evidenced by the increased shipments of grain to the Southeast by rail and truck (table 19) and to Memphis and Tennessee River ports by barge (pp. 88-89). Corn and soybeans are the principal grains moving from North Central Region country elevators to the Southeast (table 19).

Between 1954 and 1958, the proportion of nongovernment grain shipped by rail from country elevators in the North Central Region to the Southeast declined 33 percent and the proportion shipped by truck jumped 40 percent (table 19). Volume of grain increased about 51 percent. Corn volume increased 77 percent. Corn was 65 percent of the total country elevator shipments of nongovernment grain in 1954, and about 77 percent in 1958. The rail share of corn shipments declined 29 percent and the truck share increased 40 percent.

Late in 1957 southern rail lines reduced their rates for coarse grain from Ohio and Mississippi River crossings based on short line mileages, but they preserved rate equalization over the rate break points (St. Louis, Cairo, Evansville, Louisville, Cincinnati, and Memphis). Although these rates were lower than previous charges, they were still relatively high. Data in this report indicate these rates were ineffective in diverting truck and barge traffic to the rails.

Table 25 shows that truck movement of nongovernment grain, particularly corn, from country elevators in the Eastern States of the North Central Region into the Southeast increased substantially between 1954 and 1958. The volume rose from about 23 million bushels in 1954 to over 36 million in 1956, and to about 64 million bushels in 1958. Truck brokers, acting as intermediaries between shippers and truckers in arranging for motortruck transportation, handled over 13 million bushels of this corn in 1958. The merchant trucker, who buys the grain from the country elevator operator, is by far the predominant type of trucker hauling grain into the Southeast (fig. 14). The combination of the truck broker and the merchant trucker is now an established grain marketing arrangement and appears to be of growing importance.

To Wisconsin. --The volume of grain moving from country elevators in Wisconsin was excluded from this study (1, 2), but grain moving from other States in the North Central Region into Wisconsin was included. Country elevator shipments of nongovernment grain to Wisconsin points, other than the Duluth-Superior market, totaled over 5 million bushels, 38 percent by rail and 62 percent by truck. Principal movements were over 4 million bushels of corn from Minnesota, 57 percent by truck and 43 percent by rail; 669,000 bushels of soybeans from Minnesota by truck; and 190,000 bushels of oats, from Minnesota and Iowa, 62 percent by truck and 38 percent by rail.

Wisconsin is a leading dairy State with many small plants that process grain. It draws corn from country elevators in Minnesota and Iowa (table 19). In 1954, most of about 3.5 million bushels of nongovernment grain moving from country elevators in the North Central Region to Wisconsin moved by truck. Gathering rail rates for grain moving into Wisconsin markets were reduced in 1958, as indicated on page 60, and this diverted some of the traffic to the railroads. The truck share declined from about 93 percent in 1954 to about 62 percent in 1958.

Specific Effects of Rail Rate Changes on Grain Shipments

Rail Rate Increases. --Increases in rail rates since World War II, designed to meet revenue requirements of the railroads, have diverted grain traffic to competitive modes of transport. Although most country elevators ship predominantly by rail, 28 percent of the 1,605 operators interviewed in 1958 reported that increases in rail rates since January 1, 1946, have caused them to shift from rail to some other form of transportation (principally truck). Of the remaining 1,148 elevators, 1,025 reported no shift, or a shift due to reasons other than rates; 123 operators chose not to answer this question.

The shift to trucks was not so evident in areas where the haul to market was long. In such areas as North Dakota, South Dakota, Nebraska, and Kansas, a shift was seldom reported by more than 25 percent of the elevator operators. An exception was eastern South Dakota. In this area, 57 percent of the operators reported a shift to trucks, about the same as that percentage reporting a shift in Minnesota, north and south. The closer proximity of these 3 areas to markets such as Minneapolis-St. Paul, Duluth-Superior, and Sioux City probably accounts for the greater diversion. In almost every case, areas in which more than 25 percent of the operators reported a shift have a major grain market or deficit area within what may be considered a short haul.

The general trend to trucks seems to have gathered momentum with each of the several rail rate increases since 1946 and has become most apparent since 1954. Of the 107 operators giving a date of shift, 73 reported it as taking place since 1954. This would indicate that the rail rate level established by Ex parte 175-C, December 1, 1955, and succeeding increases granted by Ex parte 196-A, March 7, 1956, Ex parte 206-A, August 26, 1957, and Ex parte 212, December 23, 1957, had decided effects on the type of transportation employed by country elevator operators having available to them a choice of modes of transport. Sixty-five operators in 14 areas reported the diversion to truck had no definite date of origin, the move being gradual as each rail rate increase became effective and the differentials between rail and truck rates widened.

The degree of shifts from rail varied from slight to 100 percent, depending largely upon the location of the country elevators. Thirty-two elevators reported the degree of shift; 22 of these reported a 50-percent or greater shift from rail. Every elevator reporting a shift of this magnitude was located in an area where the truck movement either to terminal markets or to river points for barge shipment would be considered a short haul. The 10 elevators reporting a shift of 30 percent or less were located in more distant areas and had a longer haul to markets.

Even with the widening differential between truck and rail rates, it appears that country elevator operators have continued to use railroads for long hauls. It is only since 1954 that trucks have made a significant inroad on the movement of grain from elevators located in areas more distant from terminal and subterminal markets.

Country elevators in areas near terminal markets and river points, and in areas from which deficit areas draw most of their grain, reported the shift from rail as becoming significant at an early date and affecting a greater percentage of their total volume. More trucks were available to them because of their location.

Rail Rate Reductions. --In an effort to meet the grain transportation shift from rail to truck and barge, the railroads serving the North Central Region put into effect selective rate reductions where they believed competition warranted.

In general, the early reductions did not become effective until mid-1958 or later, and they affected only selected commodities moving between given stations.

The elevator operators participating in the survey were asked, "Have recent reductions in rail rates to meet competition caused you to increase the proportion of your grain shipments by rail?" Of the 1,464 elevators replying, only 673 indicated that rail rate reductions applied to shipments from their elevators, and 36 percent of these indicated an increase in their proportion of rail shipments.

Those areas most sensitive to rail rate increases were also most responsive to subsequent rate reductions. As stated above, these areas were usually closer than the other areas to terminal or subterminal markets.

In the 8 areas where general rail rate increases resulted in a shift to trucks or barges by 30 percent or more of the elevators in each area, 49 percent of the elevators reporting subsequent rate reductions increased their proportion of rail shipments after the reductions (table 30). Of the elevators located in the 12 areas in which less than 30 percent of the elevators had shifted from rail, only 19 percent of the elevators reporting rail reductions increased their rail volume after the reductions.

In the 12 areas reporting the lesser degree of shift from rail, the railroads' proportional share of total grain shipments was lower each year. However, the effect of the recent reductions may be reflected in the drop in the percentage shipped by rail from about 83 percent in 1956 to a little over 79 percent in 1957 with only a slight decline in 1958.

In the 8 areas where 30 percent or more of the elevators reported a shift from rail, the rail volume was over 61 percent of the total grain movement in 1956; it declined to just under 58 percent in 1957. With the advent of the rate reductions, there was only a slight drop in 1958. Had the reductions been in effect for the entire year, their influence probably would be more pronounced.

The influence of the rail rate reductions may be further indicated by a comparison of relative rail movements of coarse grains for the 3-year period. For the most part, reductions applied only to coarse grains and soybeans.

In the North Central Region, the volume of corn (chosen as a representative coarse grain) moving by rail from country elevators amounted to 61 percent of the total corn shipments in 1956. The railroads' portion of the 1957 volume fell to 55 percent but rose to 56 percent in 1958.

In those areas least affected by the shift from rail, a smaller proportion of the total corn shipments moved by rail each succeeding year. However, the 63.5 percent shipped by rail in 1958 was only slightly lower than the 66 percent shipped by rail in 1957. In comparison, the 1957 percentage was 9 points lower than the 1956 rail share of about 75 percent.

In 1956, the percentage of corn moving by rail from those areas in which 30 percent or more of the operators had shifted from rail was only 54 percent. The rail share fell to just under 50 percent in 1957, but rose to over 52 percent in 1958. This rise is probably due to the rail rate reductions.

TABLE 30.--Effect of recent rail rate reductions on country elevators that had shifted from use of rail to truck or barge for grain shipments, by degree of shift, North Central Region, 1958

| Group | Percentage of affected elevators that increased the proportion of rail shipments after rail rate reductions | Rail shipments as a percentage of total shipments | | | | | |
|--|---|---|---------------------|---------------------|---------------------|---------------------|---------------------|
| | | All grains | | | Corn ¹ | | |
| | | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| 12 areas in which less than 30 percent of the elevators shifted from rail ² | <u>Percent</u> 19.4 | <u>Pct.</u> 82.7 | <u>Pct.</u> 79.4 | <u>Pct.</u> 79.1 | <u>Pct.</u> 74.9 | <u>Pct.</u> 66.1 | <u>Pct.</u> 63.5 |
| 8 areas in which 30 percent or more of the elevators shifted from rail ³ | 49.1 | 61.3 | 57.9 | 57.4 | 54.1 | 49.7 | 52.3 |
| North Central Region..... | 36.1 | 71.4 | 68.3 | 68.3 | 61.2 | 55.1 | 56.0 |

¹ Representative coarse grain. Most reductions applied only to coarse grains.

² North Dakota, west and east; South Dakota, west; Nebraska, west and east; Kansas, west and east; Iowa, east; Missouri, west; West Michigan-North Indiana; East Michigan-North Ohio; and Ohio, south.

³ South Dakota, east; Minnesota, north and south; Iowa, west; Missouri, east; Illinois, west and east; and Missouri-Illinois-Indiana, south.

Derived from data in Grain Transportation Statistics for the North Central Region, tables 56 and 58 (17).

Typical of the rate reductions were those granted in September 1958, affecting southern Minnesota elevators shipping to the terminal markets of Minneapolis-St. Paul and Duluth-Superior. Seventy-four country elevator operators were interviewed in southern Minnesota, and all indicated that the railroads had reduced rates on coarse grains and soybeans from their elevators to the above markets. Of these 74 operators, 39 reported an increase in the proportion of grain shipped by rail, 35 indicated no increase in volume shipped by rail, and 1 failed to answer.

Since the reductions were applicable to all elevators studied in southern Minnesota, a detailed analysis was made of data from this area. The analysis compared volumes of corn shipped by rail and truck during the years 1956-58 from those elevators and indicated an increased proportion of rail shipments after rate reductions. The proportion shipped by rail was about 44 percent in 1956; it fell to less than 41 percent in 1957; but in 1958, it increased to over 56 percent. This indicates that the reductions enabled the railroads to recoup some of the traffic which had shifted to the other modes of transport.

Volume data from those 35 elevators which reported no increase in the proportion shipped by rail indicated a slight response to rail rate reductions. Thirty-seven percent of the corn shipped from these elevators in 1958 moved by rail, compared with 30 percent in 1957. Even with this gain, the percentage shipped by rail in 1958 was less than the 41.5 percent shipped by rail in 1956.

Overall, the 74 elevators in southern Minnesota shipped 9.4 million bushels of corn in 1956, with 43 percent shipped by rail. In 1957, these elevators shipped over 11 million bushels, but only 36 percent moved by rail. Perhaps reflecting the rate reductions, the 1958 totals show about 49 percent of 13.5 million bushels of corn moved by rail.

The effect of any rate change in this area probably is more pronounced than in any other area of the North Central Region. Two markets, Minneapolis-St. Paul and Chicago, draw most of the corn from southern Minnesota. Historically, most of the grain going to Chicago has moved by rail, taking advantage of the favorable rail rate structure. The reductions in late 1958 brought rail rates from numerous origins to Minneapolis-St. Paul down to a level competitive with truck rates. Comments by many of the operators indicate that when it is economically feasible, the added volume and handling features make rail the preferred shipping method.

Service Factors Influencing Mode of Transport

Advantages of Rail Transportation

Advantages of shipping grain by rail were reported by 1,161 elevator operators in the North Central Region, or 72 percent of the total operators returning usable questionnaires (table 31). Three advantages were indicated by 25 percent or more of the elevator operators reporting, as follows:

- (1) "Elevators better equipped to handle rail cars, cars can be loaded and unloaded at elevator's convenience, with less labor and cost," was reported 547 times or by 47 percent of the elevators. This was the advantage most frequently reported in all areas. Rail tariffs permit 2 days for loading cars. They are spotted on sidings, are out of the way, and do not interfere with other operations of the elevator such as receiving local grain from farmers. Because most country elevators were built many years ago when rail transportation was the only method available for shipping grain, they are better equipped to handle rail cars and can load them more economically than trucks.
- (2) "Can make large volume shipments." Reported by 32 percent of the country elevators stating rail advantages, this advantage was significant when capacities of railroad cars were compared to capacities of truck trailers. The volume loaded in one rail car is equal to that usually hauled in three or more trucks. The large capacity becomes more important during the harvest season, when grain has to be moved out of the elevator rapidly to make room for incoming grain.
- (3) "Better service features" includes reported advantages such as greater dependability; more reliable delivery time; more convenient; faster service; claims more easily collected; and better control of grain in transit, such as shipping by circuitous routing in order to gain temporary storage, and rail diversion and reconsignment privileges. Twenty-seven percent of the respondents reported these railroad advantages.

In terms of the number of times reported, the order of importance of the principal rail advantages was substantially the same in the Western, Central and Eastern States.

Other advantages, which were comparatively minor to the North Central Region in terms of the number of times reported but significant within areas, were "Weights and grades more satisfactory" and "Availability of transit privileges."

Elevators can appeal and request a regrading and reweighing of grain shipped by rail on arrival at markets. The advantage of "more satisfactory weights and grades" was given by only 17 percent of the reporting elevators, but was reported by 29 percent of the elevator operators in Minnesota, Iowa, and Missouri. Of the 29 percent reporting this

TABLE 31.--Advantages of shipping grain by railroad, as reported by country elevators in North Central Region, 1958

| Advantages reported | Number of times advantage was reported | | | |
|--|--|-----------------------------|-----------------------------|-----------------------------|
| | Total, North Central Region | Western States ¹ | Central States ² | Eastern States ³ |
| | <u>Number</u> | <u>Number</u> | <u>Number</u> | <u>Number</u> |
| Elevators better equipped to handle rail-cars; cars can be loaded and unloaded at elevator's convenience with less labor and lower cost..... | 547 | 236 | 136 | 175 |
| Can make large volume shipments..... | 373 | 163 | 97 | 113 |
| Better service features..... | 318 | 150 | 68 | 99 |
| Weights and grades more satisfactory..... | 194 | 89 | 77 | 28 |
| Better prices available for grain, lower handling costs..... | 190 | 76 | 49 | 65 |
| Better selection of markets..... | 98 | 59 | 24 | 15 |
| Lower rates..... | 88 | 26 | 23 | 39 |
| Transit privileges..... | 51 | 43 | 5 | 3 |
| Better for long hauls, cars are sealed, not affected by adverse weather..... | 40 | 14 | 5 | 21 |
| Other..... | 67 | 32 | 8 | 27 |
| Elevators reporting any of the above advantages..... | 1,161 | 538 | 265 | 358 |

¹ North Dakota, South Dakota, Nebraska, and Kansas.

² Minnesota, Iowa, Missouri, west, and Missouri, east.

³ Illinois, Indiana, Michigan, Ohio, and southeast Missouri.

Derived from Grain Transportation Statistics for the North Central Region, table 59(17).

advantage, 77 percent were located in Minnesota. The rail transit privilege, permitting intermediate stops between origin and destination where grain may be stored or processed, was reported as an advantage 51 times in the North Central Region, with 29 of these reports from Kansas. Transit storage and milling privileges were reported more often than any other advantage in the western Kansas area.

Disadvantages of Rail Transportation

Disadvantages of shipping grain by railroad were reported by 1,096 country elevator operators, 68 percent of those submitting usable questionnaires in the North Central Region (table 32). Those disadvantages reported by 25 percent or more of the country elevators follow in order of importance in terms of the number of times reported:

- (1) "Rail cars not always available." This disadvantage was reported most frequently in all areas except Ohio-south, and was indicated by 56 percent of the country elevators reporting rail disadvantages in the North Central Region. Elevator operators commented that rail cars often were not delivered in a reasonable time after being ordered. Particularly during harvest season, as much as a week's delay was reported as not uncommon. However, the inadequate supply of rail cars at harvesttime is not only a problem to the country elevator, but also to the railroad. Grain-laden cars tend to pile up at destination points awaiting inspection and unloading. The heavy traffic at harvesttime also causes added delay in car turn-around time (22).

TABLE 32.--Disadvantages of shipping grain by railroad, as reported by country elevators in North Central Region, 1958

| Disadvantages reported | Number of times disadvantage was reported | | | |
|--|---|-----------------------------|-----------------------------|-----------------------------|
| | Total, North Central Region | Western States ¹ | Central States ² | Eastern States ³ |
| | <u>Number</u> | <u>Number</u> | <u>Number</u> | <u>Number</u> |
| Rail cars not always available..... | 614 | 303 | 140 | 171 |
| Rail cars in poor condition, dirty, require time and expense repairing and cooping..... | 527 | 255 | 141 | 131 |
| Poor service..... | 292 | 103 | 70 | 119 |
| High rates, steadily increasing, discriminating..... | 279 | 132 | 55 | 92 |
| More loss in transit..... | 176 | 62 | 30 | 84 |
| Difficult to collect on shrinkage claims, settlement and appeals on weights and grades not satisfactory..... | 166 | 60 | 35 | 71 |
| Lower prices, slower financial returns on sale of grain..... | 82 | 16 | 16 | 50 |
| More costly to load and handle..... | 60 | 18 | 21 | 21 |
| Cannot deliver to out-of-way places..... | 28 | 10 | 10 | 8 |
| Other..... | 11 | 1 | 1 | 9 |
| Elevators reporting any of the above disadvantages..... | 1,096 | 493 | 261 | 342 |

¹ North Dakota, South Dakota, Nebraska, Kansas.

² Minnesota, Iowa, and Missouri, west and east.

³ Illinois, Indiana, Michigan, Ohio, and southeast Missouri.

Derived from Grain Transportation Statistics for the North Central Region, table 60(17).

- (2) "Rail cars in poor condition, dirty, require time and expense repairing and cooping" was reported by 48 percent of the elevators stating rail disadvantages in the North Central Region. Many of the cars placed by the railroads at elevator sidings were littered with discarded paper liners and left-over grain, frequently amounting to 10 or more bushels. Repairs, such as plugging holes in floors and walls, had to be made; car doors would not close and the condition of some cars was such that they could not be made weather-tight. In some instances it was reported that railroads offered little cooperation in replacing cars that could not be used.
- (3) "Poor service" was reported by 27 percent of the elevators giving rail disadvantages. In the Eastern States of the North Central Region, this disadvantage was indicated by 35 percent of the elevators. Disadvantages included under poor service are slow and undependable delivery time, lack of efficient service, poor switching service, and lack of cooperation from railroad employees.
- (4) "High rates, steadily increasing, discriminating" was reported 279 times. In some cases rail rates are based on maximum permissible levels at one point while a few miles away, where competitive types of transportation such as barge are available, rates to markets are considerably lower for haul of equal distance. When rail rate reductions are made, they are on a point-to-point basis; these points are usually determined by the availability of competitive transportation at origin points.

As in rail advantages, the order of importance of the principal rail disadvantages was substantially the same in the Western, Central and Eastern States.

Other stated disadvantages are: Unsatisfactory claims settlements, lower grain prices and delayed payment for grain, more expense to handle grain shipments by rail, and rail-road service not available to many out-of-the-way places in feeding areas.

Advantages of Trucks

The advantages of shipping grain by motor truck were reported by 1,032 of the 1,605 country elevators in the North Central Region, or 64 percent of the elevators submitting usable questionnaires (table 33).

The three truck advantages reported most frequently by country elevator operators were (1) cheaper rates, can ship smaller quantities, (2) better prices, lower operating costs, settlement made at elevator, and (3) faster delivery (22), more flexible, better for short hauls.

TABLE 33.--Advantages of shipping grain by motortruck, as reported by country elevators in North Central Region, 1958

| Advantages reported | Number of times advantage was reported | | | |
|---|--|-----------------------------|-----------------------------|-----------------------------|
| | Total, North Central Region | Western States ¹ | Central States ² | Eastern States ³ |
| | <u>Number</u> | <u>Number</u> | <u>Number</u> | <u>Number</u> |
| Cheaper rates, can haul smaller quantities..... | 553 | 273 | 141 | 139 |
| Better prices, lower operating costs, settlement made at elevator..... | 406 | 129 | 87 | 190 |
| Faster delivery, more flexible, better for short hauls..... | 250 | 88 | 67 | 95 |
| Loading and unloading requires less labor and expense, faster and more convenient | 236 | 99 | 57 | 80 |
| Less loss in transit..... | 154 | 54 | 19 | 81 |
| Furnish relief during car shortage at harvesttime..... | 142 | 65 | 33 | 44 |
| Trucks readily available, in good condition..... | 99 | 20 | 24 | 55 |
| Can serve out-of-the-way places, move direct to available markets..... | 82 | 39 | 19 | 24 |
| Other..... | 33 | 2 | 9 | 22 |
| Elevators reporting any of the above advantages..... | 1,032 | 428 | 241 | 363 |

¹ North Dakota, South Dakota, Nebraska, Kansas.

² Minnesota, Iowa, Missouri, west and east.

³ Illinois, Indiana, Michigan, Ohio, and southeast Missouri.

Derived from Grain Transportation Statistics for the North Central Region, table 61(17).

Cheaper rates were reported as an advantage by 64 percent of the elevators in the Western States of the North Central Region, 59 percent in the Central States, and 38 percent in the Eastern States. In the Western and Central States the rate advantage was reported more times than any other advantage. Trucks are not regulated as to rates and routes for hauling grain, one of the agricultural commodities falling within the "Agricultural Exemption Clause" of Part II of the Interstate Commerce Act, (page 34).

Truck rates are cheaper than rail rates for a number of reasons. Trucks have less waiting time for loading and can use grain as a backhaul. Truck charges for transporting grain do not provide for any transit privileges. Truckers do not have the high fixed costs that railroad rates must cover. Because their carrying capacity is limited, trucks haul small quantities that otherwise would not move, since railroad rates for less-than-carload lots are considerably higher than rail rates for carload lots. There is one exception. Railroad tariffs permit application of the rail carload rates to less-than-carload shipments at the close of the season when cleanout of elevators occurs. Often grain receivers are better able to store smaller quantities delivered by truck. When grain is a backhaul, truckers can and do charge comparatively low rates. Grain is used as a backhaul by both regulated and private motor carriers, since it moves as an exempt commodity.

"Better grain prices, lower operating costs, settlement made at elevator," was the advantage reported most frequently in the Eastern States, and was second in the number of times reported in the Western and Central States of the North Central Region. It was reported by 39 percent of the elevators reporting advantages of trucks. Better prices result from lower rates charged by truckers; the merchant trucker, who buys grain from the country elevator operator, often will pay a better price for it. He assumes the risk of any loss in weight or grade at destination. Lower operating costs result because many truckers furnish their own labor for loading and unloading trucks. Payment made by the merchant trucker for the grain on the basis of weight and grade at the time of loading relieves the elevator operator of any financial risk while grain is being transported to its destination.

But the merchant trucker is not the only outlet that pays higher prices when shipment is made by truck, as the responses of terminal elevator operators indicate. Generally, because trucked grain bound for a terminal market is not entitled to the low proportional or transit balance rail rates beyond markets, it would be discounted and the price paid the country elevator operator would be lower. However, table 34 shows that a rather substantial number of the sampled terminal elevators do not discount trucked grain, the most frequently reported reason being their heavy demand for grain and need for expedited delivery.

"Faster delivery, more flexible, better for short hauls" was indicated by 24 percent of those elevators reporting truck advantages. This advantage was reported less frequently in the Western States than in either the Central or Eastern States of the North Central Region. This heading includes such advantages as more direct movement, no loss in time due to rail switching, and being able to make short hauls in a matter of hours.

The following are other advantages that are somewhat related: Trucks furnish relief during rail car shortages at harvesttime; trucks are readily available, and are in good condition, can serve out-of-the-way places such as feeding areas, and move directly to available markets. These combined advantages were reported by 31 percent of the country elevators.

Disadvantages of Trucks

Disadvantages in using motortrucks for grain movement were reported by 932 elevator operators, or 58 percent of those elevator operators returning usable questionnaires (table 35).

TABLE 34.--Terminal elevators in the North Central Region which did not discount trucked grain (relative to rail-delivered grain), by reason given, 1958

| Reason for not discounting trucked grain | Elevators reporting |
|--|---------------------|
| | Number |
| Demands are sometimes heavy and more volume is needed quickly..... | 7 |
| Truck shipments command premiums; bids are practically always higher than rail bids..... | 4 |
| Never discount trucked grain..... | 2 |
| Trucks deliver moist grain quickly with minimum spoilage..... | 2 |
| Grain is purchased at nearby elevators and hauled in elevator's own trucks..... | 1 |
| Prices for truck-barge grain are the same as rail track prices..... | 1 |
| Elevator has outlet for inbound truck grain moving outbound by barge... | 1 |
| Truck bids are often higher for outbound lake shipments..... | 1 |
| No reason stated..... | 2 |
| Total, North Central Region ¹ | 21 |
| Terminal elevators in North Central Region receiving grain by truck.... | 62 |
| Terminal elevators in North Central Region which discount trucked grain | 34 |
| Terminal elevators in North Central Region receiving grain by truck only..... | 7 |
| Terminal elevators in North Central Region which do not discount trucked grain..... | 21 |

¹Of the elevators giving reasons for not discounting trucked grain, 11 were located at on-water sites and 8 were located at interior sites.

Grain Transportation Statistics for the North Central Region, table 73, (17).

The disadvantage, "Elevators not equipped to handle trucks expeditiously; trucks cause congestion and must be loaded immediately," was indicated by 44 percent of the operators reporting disadvantages. Not all elevators have the proper equipment for loading trucks, and at some elevators, trucks are loaded and unloaded in the same space so that only one operation can be performed at a time. Trucks line up in or beside the driveway and make movement to and from the elevator difficult. Truckers often insist upon loading their trucks immediately upon arrival. This practice causes a slow-down or stopping of other operations at the elevator. Truckers say that idle time costs them in revenue about \$5 to \$10 per hour, and with their low rates they must keep moving as much of the time as possible.

Other disadvantages were reported as follows: Cannot handle large volume shipments; weights and grades not satisfactory and cannot be appealed; high inspection fees; no credit ratings, risk of bad checks, and irresponsible drivers.

Weights and grades on truck shipments of grain at destination usually must be accepted by country elevator operators when the shipment is made by a for-hire motor carrier. Trucks are unloaded on arrival at the terminal or processing plant, so that the country elevator operator has no chance to appeal for reinspection if he is dissatisfied. This procedure differs from rail delivery in that rail cars, after weighing and grading, usually are not unloaded the same day. This permits sufficient time for notifying the country elevator operator of the grade and weight and gives him time to appeal before the grain is dumped.

TABLE 35.--Disadvantages of shipping grain by motortruck, as reported by country elevators in North Central Region, 1958

| Disadvantages reported | Number of times disadvantage was reported | | | |
|--|---|-----------------------------|-----------------------------|-----------------------------|
| | Total, North Central Region | Western States ¹ | Central States ² | Eastern States ³ |
| | <u>Number</u> | <u>Number</u> | <u>Number</u> | <u>Number</u> |
| Elevators not equipped to handle trucks expeditiously; trucks cause congestion must be loaded immediately..... | 411 | 195 | 107 | 109 |
| Cannot handle large volume shipments..... | 179 | 89 | 39 | 51 |
| Weights and grades not satisfactory; cannot appeal; high inspection fees.... | 177 | 100 | 65 | 12 |
| No credit ratings, risk of bad checks, irresponsible drivers..... | 144 | 70 | 44 | 30 |
| Market prices lower, fewer available markets by truck..... | 140 | 86 | 20 | 34 |
| Trucks not readily available at times.... | 93 | 36 | 16 | 41 |
| High rates..... | 80 | 20 | 5 | 55 |
| Poor service, less dependable..... | 64 | 14 | 21 | 29 |
| High operating costs, more accounting costs..... | 49 | 29 | 10 | 10 |
| Limited by weather conditions and weight and size restrictions..... | 42 | 26 | 7 | 9 |
| Elevator has no control over shipment.... | 18 | 6 | 9 | 3 |
| Greater loss from shrinkage..... | 8 | -- | 3 | 5 |
| Other..... | 26 | 9 | 10 | 7 |
| Elevators reporting any of the above disadvantages..... | 932 | 428 | 213 | 291 |

¹ North Dakota, South Dakota, Nebraska, Kansas.

² Minnesota, Iowa, Missouri, west, and Missouri, east.

³ Illinois, Indiana, Michigan, Ohio, and Southeast Missouri.

Derived from Grain Transportation Statistics for the North Central Region, table 62 (17).

Advantages and Disadvantages of Barges

Thirty-five country elevators in the North Central Region reported advantages for shipping grain by barge, and 23 reported disadvantages (17). Areas represented by reporting elevator operators were eastern Nebraska, Iowa, Missouri, Illinois, and southern Indiana.

Lower rates were indicated by 22 country elevator operators as the most important advantage for using barges. Other advantages were better prices for grain, and large volumes can be shipped in barges.

The disadvantage reported most frequently was the shortage of barges at times, particularly during harvest season. This disadvantage was indicated by 7 country elevator operators.

Comparative Advantages and Disadvantages

The advantages and disadvantages of rail and truck for the transportation of grain are in several instances directly related.

"Elevators better equipped to handle rail cars...." was reported by country elevator operators as the most important advantage of shipping grain by rail. The disadvantage of motortrucks for shipping grain reported most frequently was "Elevator not equipped to handle trucks expeditiously...."

Motortrucks were reported to be disadvantageous because of their limited capacity; rail cars were more advantageous for large shipments. However, the reverse was indicated for smaller shipments. Less-than-carload rail shipments could be shipped more advantageously by motortruck at truckload rates, except when cleanout shipments were made by the elevator (page 75).

Eight percent of the elevators reported lower rail rates as an advantage, while 54 percent indicated cheaper truck rates as an advantage.

As a disadvantage, the shortage of rail cars was reported by 56 percent of the country elevator operators. In some cases, rail cars were switched or delivered only twice a week. Harvest season caused a shortage of rail cars and railroads could not always deliver cars on short notice, so that trucks had to be used to move excess grain. In contrast to those reporting the shortage of rail cars, only 10 percent replied that trucks were not readily available.

Rail cars were reported as being better for long hauls and for movement of grain to major markets. Trucks were reported as being better able to serve out-of-the-way markets, particularly feeding areas and other destinations in the Southeast and the Southwest, because of direct movement instead of the time-consuming interchanges and sometimes circuitous routings that railroads follow.

Resulting Shifts in Mode of Transport

Country elevator operators in the North Central Region were asked whether the quality of service provided by the several types of carriers had caused them to shift to an alternate form of transportation for shipping grain. Of the 1,605 returns, 26 percent of the elevator operators stated they had shifted from their usual carrier because of poor service. Service factors causing a shift to truck transportation were reported 503 times, while service factors causing a shift to rail transportation were reported 21 times.

"Rail cars not readily available" was the most frequently reported reason for shifting to motortruck. This was indicated by 171 elevator operators. Other factors reported were "Lower truck rates," "Poor condition of rail cars," and "Better service by truck."

Only 21 country elevator operators reported that service factors caused them to shift to rail carriers. The most frequent comment was "Better service by rail," stated by 6 elevator operators. The small number of elevators that indicated a shift to rail carriers results from the fact that most country elevators ship grain chiefly by rail, whereas, only a few elevators ship grain chiefly by truck.

Government-Owned Grain Shipments From Country Elevators, 1956-58

The movement of Government-owned (CCC) grain was an important part of the overall volume of grain handled by country elevators during the 3-year period. In 1958, about 15 percent of all shipments from country elevators was Government grain, compared with about 17 percent in 1956 and about 23 percent 1957 (table 36). The increased volume and

TABLE 36.--Percentage distribution of Government and nongovernment grain shipments from country elevators, North Central Region, by area, 1956-58

| Area | 1956 | | | 1957 | | | 1958 | | |
|---------------------------------------|-----------------|------------|----------------|-----------------|------------|----------------|-----------------|------------|----------------|
| | Total shipments | Government | Non-government | Total shipments | Government | Non-government | Total shipments | Government | Non-government |
| | 1,000 bu. | Percent | Percent | 1,000 bu. | Percent | Percent | 1,000 bu. | Percent | Percent |
| North Dakota, west..... | 72,336 | 27.8 | 72.2 | 75,936 | 31.0 | 69.0 | 72,702 | 28.8 | 71.2 |
| North Dakota, east..... | 120,434 | 25.4 | 74.6 | 131,737 | 24.5 | 75.5 | 129,684 | 22.6 | 77.4 |
| South Dakota, west..... | 19,347 | 38.8 | 61.2 | 21,836 | 40.1 | 59.9 | 27,309 | 37.1 | 62.9 |
| South Dakota, east..... | 58,063 | 11.4 | 88.6 | 73,185 | 11.7 | 88.3 | 84,091 | 5.4 | 94.6 |
| Nebraska, west..... | 34,176 | 11.9 | 88.1 | 38,682 | 23.7 | 76.3 | 65,610 | 29.6 | 70.4 |
| Nebraska, east..... | 42,687 | 24.5 | 75.5 | 58,669 | 20.7 | 79.3 | 102,611 | 27.2 | 72.8 |
| Kansas, west..... | 86,047 | 32.0 | 68.0 | 96,771 | 18.4 | 81.6 | 159,916 | 17.6 | 82.4 |
| Kansas, east..... | 66,251 | 27.7 | 72.3 | 63,346 | 21.4 | 78.6 | 86,894 | 24.2 | 75.8 |
| Minnesota, North..... | 67,181 | 28.4 | 71.6 | 78,268 | 27.7 | 72.3 | 68,563 | 19.5 | 80.5 |
| Minnesota, South..... | 123,536 | 8.1 | 91.9 | 155,796 | 25.7 | 74.3 | 143,292 | 3.7 | 96.3 |
| Iowa, west..... | 118,302 | 28.2 | 71.8 | 177,655 | 42.9 | 57.1 | 196,432 | 28.3 | 71.7 |
| Iowa, east..... | 36,035 | 32.6 | 67.4 | 67,996 | 48.9 | 51.1 | 67,904 | 23.8 | 76.2 |
| Missouri, west..... | 26,827 | 9.6 | 90.4 | 27,877 | 13.8 | 86.2 | 40,039 | 6.9 | 93.1 |
| Missouri, east..... | 23,720 | 8.8 | 91.2 | 25,598 | 17.8 | 82.2 | 31,342 | 12.5 | 87.5 |
| Illinois, west..... | 105,050 | 13.8 | 86.2 | 114,954 | 19.4 | 80.6 | 125,142 | 6.9 | 93.1 |
| Illinois, east..... | 292,334 | 12.9 | 87.1 | 305,855 | 20.5 | 79.5 | 318,192 | 11.9 | 88.1 |
| Missouri-Illinois-Indiana, south..... | 86,607 | 5.7 | 94.3 | 61,875 | 8.7 | 91.3 | 64,696 | 2.7 | 97.3 |
| W. Michigan-N. Indiana..... | 138,205 | 5.6 | 94.4 | 143,002 | 9.8 | 90.2 | 158,324 | 2.1 | 97.9 |
| E. Michigan-N. Ohio..... | 121,650 | 5.3 | 94.7 | 101,850 | 3.1 | 96.9 | 135,762 | 1.2 | 98.8 |
| Ohio, south..... | 54,272 | 12.1 | 87.9 | 49,618 | 14.8 | 85.2 | 42,651 | 8.7 | 91.3 |
| North Central Region..... | 1,693,060 | 16.6 | 83.4 | 1,870,506 | 22.5 | 77.5 | 2,121,156 | 14.9 | 85.1 |

Data from Grain Transportation Statistics for the North Central Region, tables 20 and 21 (17).

resulting higher percentage of Government grain moved in 1957 reflected the favorable export market conditions of that year. Increased demand prompted heavy movement of Government-owned grain to terminal outlets to meet the export requirements.

Corn and wheat accounted for better than 70 percent of the yearly Government grain traffic reported for 1956-58. Wheat, oats, and barley shipments declined over the 3-year period, but corn, soybeans, and sorghums for grain increased, accounting for the overall gain during the period. The greatest relative increase occurred in the movement of sorghums for grain, with Government shipments jumping from less than 4 million bushels in 1956 to more than 41 million bushels in 1958.

In each of the 3 years, the corn producing States of Iowa and Illinois accounted for about 64 percent of the total movement of Government-owned corn. Southern Minnesota, eastern Nebraska and West Michigan-North Indiana also contributed heavily to the volume of corn, especially in the bumper year of 1957.

The application to corn exports of the "payment in kind" export program (Public Law 480) in May 1958 (Commodity Stabilization Service Announcement No. GR-368) resulted in a sharp decline in the amount of this grain moving under Government contract in that year, compared with 1957 (p.34). Corn shipments were 125 million bushels less in 1958.

Movement of Government grain was heaviest in four States west of the Mississippi River--North Dakota, Nebraska, Kansas, and Iowa. In each of these States, the Government's share of the total volume each year was equal to or above the Government's percentage reported for the entire North Central Region. In 1956, from 19 to 30 percent of the grain moving from country elevators in these four States was Government grain. The 1957 range was from 22 to 55 percent and in 1958, the Government grain movement ranged from just under 20 percent to over 28 percent of the total movement in each of the four States.

Also indicative of the importance of Government grain to the country elevators is the rate of expansion of storage facilities. The States most active in Government grain traffic reported an expansion of more than 38 percent during 1958, compared with 20 percent for the remaining States and 32 percent for the entire North Central Region.

To gain flexibility in storage location, through use of transit privileges, the Government moved its grain almost totally by rail during the 3 years; it shipped slightly under 99 percent of this grain by this mode each year. Any grain reported shipped by truck was usually being moved to nearby storage points or was a cleanup shipment with insufficient volume for a full boxcar. The only reported barge shipments of Government grain were from country elevators along the Illinois River with no other mode available for outshipment. Barge volume was never more than 0.1 percent of the regional total for any one year.

TERMINAL ELEVATOR GRAIN TRANSPORTATION

Storage Capacities and Facilities for Handling Grain

The 93 terminal elevators from which the data for this analysis were obtained had a combined storage capacity of about 459 million bushels in 1958 (20). About 25 percent of this capacity was located at 28 elevators equipped with facilities for handling grain moved by water.

Loading and unloading facilities available at these waterside elevators differed, depending upon the market area (fig. 2). Many of the elevators along the inland rivers were small elevators, equipped only for barge outshipment and a rapid turnover of capacity. Elevators in this category rely on truck shipments from nearby country points to meet their grain requirements. Illustrative of this fact, only 6 of the 13 riverside elevators reporting from the Lower River market area indicated any receipts by rail in 1958 and only 7 elevators had unloading facilities for inbound rail traffic. All other on-water elevators reported receipts of grain by rail in 1958.

Overall, the primary mode of transport utilized by terminal elevators for grain movement inbound or outbound was rail. Over 90 percent of the operators interviewed indicated availability of equipment for the loading or unloading of rail cars of grain. Two-thirds of the elevators were equipped to handle receipts by truck, but only one-half could load trucks.

Of the 65 elevators located in Interior market areas, or at off-water points within market areas containing waterside elevators, 24 elevators reported the use of the on-water facilities in 1958. Low-cost water transportation was utilized by routing shipments through nearby public transfer facilities or company-owned facilities located within switching distance.

During the period 1954-58, the volume of grain moving through the terminal elevators increased by more than 55 percent. This influx of grain brought about the need for more efficient and more capacious handling facilities and resulted in widespread installation of power equipment. Prominent among the projected installations were improvements in the receiving of trucked grain at Great Lakes terminals and the raising of loading spouts to enable loading of ocean-going vessels coming through the new St. Lawrence Seaway.

The covered hopper rail car has been introduced into the field of grain transportation (30). Many handlers of grain have not yet adapted their facilities either for loading or unloading this type of car, and only a limited number of these cars are available to the grain trade. While trade opinion is divided regarding the desirability of having more of these cars, generally those elevators properly equipped for loading and unloading them found them advantageous, while elevators not properly equipped indicated their greater use would be disadvantageous. Sixty-eight percent of the elevators studied were equipped with undertrack pits for receipt of grain from covered hopper cars.

Of the elevators reporting advantages for covered hopper cars, the advantages most commonly reported were (1) reduced costs of loading and unloading; (2) faster loading and unloading; and (3) less shrinkage. However, an almost equal number of elevators reported such disadvantages as these: (1) Specialized equipment is needed for loading and unloading; (2) loading hopper cars is more difficult than loading boxcars because elevator is not properly equipped; (3) railroads are reluctant to interchange covered hopper cars (15, 58); and (4) accurate sampling is difficult with present sampling equipment.

Many terminal elevators reload incoming carrier equipment for outshipment before turning it back to the railroad or trucker. This is a time-saving practice and reduces miles covered by empty vehicles. Since many terminal elevators do not receive any grain by barge or lake boat or do not ship by truck, this practice applies principally to the rail movement of grain. Of the 93 terminal elevators in the sample, 81 indicated they followed this practice whenever possible. This number would have undoubtedly been higher except for the number of on-river elevators which did not receive grain by rail. Thirty-six elevators reported 50 percent or more of the inbound cars were reloaded for outshipment and another 14 elevators reported that 25 to 49 percent of the incoming cars were reloaded before they were turned back to the railroads.

Another 31 elevators reported some reloading; only 3 stated that none of the incoming rail cars were reloaded. An increasing trend to bulk shipments of feed and flour may result in increased use of covered hopper cars for inbound grain shipments (40). So long as these products are shipped in bags, the boxcar offers an advantage over covered hopper cars for outbound shipments.

Grain Shipments From Terminal Elevators

About one-fourth of the 1958 grain shipments from terminal elevators of the North Central Region were Government-owned (CCC) grain (table 37). The volume relationship of this grain to nongovernment (free) grain varied according to the market area and the mode of transport used for outshipment. In general, the movement of Government grain was concentrated in the western and central areas of the region; only 13 percent of the total Government shipments moved from terminal elevators located in the Lower River, Lakes Michigan, Huron, and Erie, and Eastern Interior market areas. About 58 percent of the Government grain shipments originated from terminals in the western area and another 29 percent from terminals in the central area. In contrast, the western area handled only 28 percent of the total grain shipments, Government and nongovernment. The central area shipped 30 percent, and 42 percent originated at terminal elevators in the eastern area.

Of the 295 million bushels of Government-owned grain handled by terminal elevators in the North Central Region, almost 268 million bushels were shipped by rail (table 37). Except for some inter-elevator transfer by truck, the remaining volume was shipped by water, primarily by lake boat from the Lake Superior market area and by barge from the Upper Mississippi River market area.

About 91 percent of the Government grain shipments from terminals in the North Central Region in 1958 were moved by rail which permits the grain to be shipped to favorable storage locations through use of rail transit privileges; only 55 percent of the nongovernment volume moved by rail (table 38). Although truck shipments of grain were minor in 1958 regardless of grain ownership, river and lake shipments in the central area of the North Central Region cut into the rail volume of both Government and nongovernment grain. In this area about 30 percent of the Government grain moved by water, mostly by lake; over 63 percent of the nongovernment grain moved by water, with river shipments double those by lake. In the eastern area water shipment of Government grain was minor. In contrast, 42.5 percent of the nongovernment grain moved from terminals by waterways, and river movement predominated.

TABLE 37.--Government-owned (CCC) grain shipments from terminal elevators in North Central Region, and percentage relationship to total grain shipments, by market area and mode of transport, 1958

| Market area | Rail | | Water | | All modes | |
|---------------------------------|------------------|---|------------------|--|---------------------|--|
| | Volume | Percentage of total rail shipments ¹ | Volume | Percentage of total water shipments ¹ | Volume | Percentage of total shipments ¹ |
| | <u>1,000 bu.</u> | <u>Percent</u> | <u>1,000 bu.</u> | <u>Percent</u> | <u>1,000 bu.</u> | <u>Percent</u> |
| Missouri River..... | 96,045 | 48.4 | -- | -- | 96,045 | 47.0 |
| Upper Mississippi River..... | 25,574 | 28.7 | 5,378 | 4.6 | 30,952 | 15.1 |
| Lower River..... | 4,079 | 12.7 | 176 | .1 | 4,255 | 2.1 |
| Lake Superior..... | 8,620 | 28.2 | 20,794 | 24.2 | 29,414 | 25.3 |
| Lakes Michigan, Huron, and Erie | 23,977 | 16.0 | ² 517 | 1.3 | ³ 24,522 | 12.7 |
| Western Interior..... | 76,762 | 59.6 | -- | -- | 76,762 | 58.3 |
| Central Interior..... | 24,569 | 76.8 | -- | -- | 24,569 | 60.6 |
| Eastern Interior..... | 8,297 | 7.9 | -- | -- | 8,297 | 7.6 |
| North Central Region..... | 267,923 | 35.0 | 26,865 | 6.5 | 294,816 | 24.6 |

¹ For nongovernment grain shipments in 1958, by the western, central, and eastern areas of the North Central Region, see table 38.

² Volume includes 106,000 bushels shipped by barge and 411,000 bushels shipped by lake boat.

³ Includes 28,000 bushels shipped by truck.

Derived from data in Grain Transportation Statistics for the North Central Region, table 70 (17), and supplementary information.

In the western area Government and nongovernment grain volume moving from terminals was about the same, and the railroads handled nearly all of the traffic.

The availability of lower cost water transportation and the selection by the private grain trade of the mode of transporting a large part of the grain shipments have resulted in extensive use of water transportation of grain in the central and eastern areas (1).

Shipments of Government and nongovernment grain by terminal elevators in the North Central Region rose steadily each year during the 1954-58 period (17). Total shipments in 1958 were 1.2 billion bushels, 55 percent greater than the 1954 volume. For 1954-56, wheat, followed closely by corn, was the major grain shipped from the terminals. In 1958, corn shipments amounted to 39 percent and wheat was just under 34 percent of total shipments. The relative volume of oats shipped through the terminal markets was fairly constant throughout most of the period. Shipments ranged from 8 to 11 percent of the overall total, except in 1958 when oats dropped to less than 7 percent of all grains. The growing production of soybeans and sorghums for grain is evidenced by their increased share of total shipments from terminals. Soybeans accounted for under 7 percent of the total in 1954 and almost 10 percent in 1958. Shipments of sorghums for grain totaled less than 1 percent of the overall shipments in 1954, but expanded to about 5 percent of the total in 1958.

The mode of transport used to move these grains from the terminal elevator varied, depending upon the location of the elevator. Overall, rail was the mode predominantly employed. But when the elevators had water transportation available, either over inland rivers or on the Great Lakes, they made extensive use of it. Truck shipments were not significant. However, the relative share moving from terminal markets in the North Central Region by truck increased each year, from 0.4 percent of the total movement in 1954 to about 2 percent in 1958 (table 39). The railroads handled the major part of the grain shipments from terminal elevators in each of the 5 years, but their relative share showed a slight decline and water and truck carriers showed corresponding increases. The rail share of soybeans and oats traffic was most affected by truck and water movements. The

TABLE 38.--Government and nongovernment grain shipments from terminal elevators in the western, central and eastern areas of the North Central Region, and percentage distribution by mode of transport, 1958

| Area | Government shipments | | | | | Nongovernment shipments | | | | |
|--------------------------------|----------------------|-------------------------|------------------|-------------|-------------|-------------------------|-------------------------|-------------|-------------|-------------|
| | Volume | Percentage shipped by-- | | | | Volume | Percentage shipped by-- | | | |
| | | Rail | Truck | Water | | | Rail | Truck | Water | |
| | | | | River | Lake | | | | River | Lake |
| | <u>1,000 bu.</u> | <u>Pct.</u> | <u>Pct.</u> | <u>Pct.</u> | <u>Pct.</u> | <u>1,000 bu.</u> | <u>Pct.</u> | <u>Pct.</u> | <u>Pct.</u> | <u>Pct.</u> |
| Western ¹ | 172,807 | 100.0 | -- | -- | -- | 163,252 | 94.5 | 3.0 | 2.5 | -- |
| Central ² | 88,625 | 70.3 | -- | 6.2 | 23.5 | 308,112 | 33.9 | 2.8 | 42.2 | 21.1 |
| Eastern ³ | 33,384 | 98.4 | 0.1 | 0.3 | 1.2 | 433,412 | 55.2 | 2.3 | 34.7 | 7.8 |
| North Central Region.... | 294,816 | 90.9 | (⁴) | 1.9 | 7.2 | 904,776 | 55.0 | 2.6 | 31.5 | 10.9 |

¹ Missouri River and Western Interior market areas.

² Upper Mississippi River, Lake Superior, Central Interior market areas, and Lower Mississippi River terminals.

³ Lower River (with the exception of Lower Mississippi River terminals), Lakes Michigan, Erie, and Huron, and Eastern Interior market areas.

⁴ Less than 0.05 percent.

Derived from data in Grain Transportation Statistics for the North Central Region, tables 70 and 71(17) and supplementary data.

relative rail share of soybean traffic in 1954 was over 47 percent; it declined to 21 percent in 1958. For oats, the railroads' 1954 share was 77 percent; in 1958, it was about 46 percent. Barges handled over 67 percent of the soybeans and about 41 percent of the oats in 1958.

For each of the terminal market areas the choice of transport probably depends on the kind of grain to be shipped and the location of the elevator. A considerable portion of all grain was shipped via water when it was available, but wheat, barley, corn, and sorghums for grain moved primarily by rail. In market areas where the truck volume was of any consequence, the relative share moving by trucks was generally highest for the feed grains.

Missouri River Market Area

Principal grains moving from terminals in this market area were wheat, corn, and sorghums for grain. In each of the 5 years grain shipped from this area moved largely by rail. The comparatively shallow draft available for barges and the scarcity of on-river grain transfer facilities limited grain shipments on the Missouri River. River traffic had a pronounced upward trend, but the 1958 volume was still only 2 percent of the total grain shipments. This share probably was higher in 1959 and is likely to continue rising as improved channels and handling facilities become available.

Wheat accounted for 3 million out of the 4 million bushels of grain shipped by barge in 1958, and sorghums for grain and corn made up the remainder of barge traffic.

TABLE 39.--Percentage distribution of grain shipments from terminal elevators, North Central Region, by mode of transport and market area, 1954-58

| Mode of transport and year | North Central Region | Market area | | | | | | | |
|-------------------------------|----------------------------|-------------------|------------------------------------|----------------|------------------|--|---------------------|---------------------|---------------------|
| | | Missouri River | Upper Missis- sippi River | Lower River | Lake Superior | Lakes Mich- igan, Huron, and Erie | Western Interior | Central Interior | Eastern Interior |
| | | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent |
| Rail: | | | | | | | | | |
| 1954..... | 68.7 | 98.6 | 74.6 | 22.9 | 29.6 | 81.3 | 97.4 | 98.8 | 99.1 |
| 1955..... | 66.4 | 98.5 | 79.8 | 23.2 | 20.6 | 74.9 | 97.7 | 86.8 | 98.4 |
| 1956..... | 63.9 | 96.9 | 76.0 | 19.5 | 15.5 | 80.6 | 97.7 | 84.2 | 98.5 |
| 1957..... | 66.2 | 97.7 | 63.4 | 16.5 | 28.9 | 80.8 | 96.0 | 73.0 | 98.5 |
| 1958..... | 63.9 | 97.1 | 43.4 | 16.1 | 26.3 | 77.6 | 97.8 | 78.9 | 96.3 |
| Truck: | | | | | | | | | |
| 1954..... | 0.4 | 0.2 | -- | -- | -- | 0.5 | 2.6 | 1.2 | 0.9 |
| 1955..... | .8 | .2 | -- | 0.3 | -- | .4 | 2.3 | 13.2 | 1.6 |
| 1956..... | 1.1 | 1.1 | -- | .2 | -- | .5 | 2.3 | 15.8 | 1.5 |
| 1957..... | 1.7 | 1.2 | (¹) | .2 | (¹) | .5 | 4.0 | 27.0 | 1.5 |
| 1958..... | 1.9 | .9 | (¹) | .6 | -- | 2.4 | 2.2 | 21.1 | 3.7 |
| Water: | | | | | | | | | |
| 1954..... | 30.9 | 1.2 | 25.4 | 77.1 | 70.4 | 18.2 | -- | -- | -- |
| 1955..... | 32.8 | 1.3 | 20.2 | 76.5 | 79.4 | 25.7 | -- | -- | -- |
| 1956..... | 35.0 | 2.0 | 24.0 | 80.3 | 84.5 | 18.9 | -- | -- | -- |
| 1957..... | 32.2 | 1.1 | 36.6 | 83.3 | 71.1 | 18.7 | -- | -- | -- |
| 1958..... | 34.2 | 2.0 | 56.6 | 83.3 | 73.7 | 20.0 | -- | -- | -- |

¹ Less than 0.05 percent of total shipments.

Derived from Grain Transportation Statistics for the North Central Region, tables 70 and 71, (17).

Truck shipments accounted for less than 1 percent of all grain traffic moving from the terminal elevators in 1958; over one-half of the trucked volume was corn. Although still relatively insignificant, the trucks' share of total grain movement rose from 0.2 percent to about 1 percent during the 5-year period.

Upper Mississippi River Market Area

Corn and soybeans accounted for 57 percent of the 205 million bushels of grain shipped by terminal elevators in this area in 1958. The remaining volume was divided about equally between wheat, barley, and oats. Total shipments more than doubled during the period 1954-58, with all grains showing an increase. Soybean shipments in 1958 were more than seven times the 1954 volume. Corn shipments increased from over 30 million bushels in 1954 to about 75 million in 1958.

The effects of the growing demand for export grain at New Orleans-Baton Rouge, the broad market for grain moving through Tennessee River ports into the Southeast, and the widening differential between rail and barge rates are reflected in the substantial increase of grain shipments by barge. Until 1957, grain shipped by barge was never more than about 25 percent of the total. In 1957, nearly 37 percent of the total grain volume moved via inland waterways. Barge shipments were 57 percent of total shipments in 1958. Table 40 shows that most of the barged grain went to New Orleans-Baton Rouge and to Tennessee River ports for ultimate southeastern destinations.

Truck traffic in this market area was of little or no consequence. Virtually all grain not shipped by barge moved from terminals by rail. Ninety-three percent of the barley and 67 percent of the wheat were shipped by rail.

Lower River Market Area

Many of the terminal elevators in this market area were built solely to take advantage of the lower charges offered by barge transportation and were not equipped for shipping grain by any other mode of transport. Consequently, the 1958 survey indicated that at no time did as much as 1 percent of the grain move out by truck, nor as much as 25 percent of the total shipments move by rail (table 39). The major share of barley and sorghums for grain were shipped by rail, but these accounted for less than 1 percent of the total grain shipments in any one year. The relative rail share of wheat shipments declined from about 58 percent in 1954 to 29.5 percent in 1958.

The proportion of the grain shipped by barge changed very little from year to year. Barges moved about 77 percent in 1954 and 1955. Their share rose to 83 percent in 1957 and 1958.

Lake Superior Market Area

In each of the 5 years, over one-half the grain shipped from terminal elevators in this area was wheat. Barley and oats accounted for most of the other shipments, with corn and soybeans making up the remainder.

Here, as in the Lower River market area, the terminal elevators were built primarily to take advantage of the lower cost of transporting grain by vessels. Shipments moved to Canadian destinations or to eastern lake ports for transshipment via barge or rail to domestic outlets or eastern seaports for overseas export. The variation in export and eastern domestic demand and the length of the navigation season probably accounts for the variation in the percentage of total shipments moving by lake during 1954-58. This percentage jumped from 70 percent in 1954 to over 84 percent in 1956 (table 39). In 1957 there was a sharp drop to 71 percent, followed by a small rise in 1958. Rail shipments varied accordingly; no truck volume of any consequence was reported. The lake's share

TABLE 40.--Percentage distribution of barge shipments of grain originating on waterways within the North Central Region, by major destination, 1956-58¹

| Origin | Chicago | | | St. Louis, Mo., and East St. Louis, Ill. ² | | | Tennessee River | | |
|---|------------------|------------------|------------------|--|------------------|------------------|-----------------|---------|---------|
| | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| Minnesota, Black, and Mississippi Rivers: Minneapolis to mouth of Missouri River..... | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent |
| Mississippi River: Mouth of Missouri River to Mouth of Ohio River..... | 9.2 | 1.6 | 1.7 | 5.8 | 5.7 | 2.6 | 11.9 | 18.0 | 28.2 |
| Ohio River..... | 3.6 | .7 | 1.2 | (⁵) | (⁵) | (⁵) | 15.2 | 27.6 | 30.0 |
| Missouri River..... | 1.4 | .4 | .4 | 2.4 | 3.4 | 2.2 | 63.3 | 67.5 | 70.7 |
| Illinois River..... | 35.1 | 15.8 | 12.4 | 13.0 | 6.4 | 7.0 | 26.7 | 44.4 | 37.4 |
| Port of Chicago..... | 64.1 | 66.9 | 46.5 | 1.3 | 1.3 | 1.7 | 2.7 | 6.3 | 14.4 |
| | (⁵) | (⁵) | (⁵) | -- | -- | 2.3 | 29.4 | 8.5 | 9.4 |
| All origins..... | 31.6 | 25.6 | 18.1 | 2.5 | 2.6 | 2.0 | 13.2 | 19.7 | 24.8 |

| Origin | Memphis, Tenn ³ | | | Baton Rouge-New Orleans, La., and other Gulf ports ⁴ | | |
|---|----------------------------|---------|---------|--|---------|---------|
| | 1956 | 1957 | 1958 | 1956 | 1957 | 1958 |
| Minnesota, Black, and Mississippi Rivers: Minneapolis to mouth of Missouri River..... | Percent | Percent | Percent | Percent | Percent | Percent |
| Mississippi River: Mouth of Missouri River to Mouth of Ohio River..... | 5.1 | 7.0 | 6.1 | 68.0 | 67.7 | 61.4 |
| Ohio River..... | 9.5 | 11.5 | 9.9 | 71.7 | 60.2 | 58.9 |
| Missouri River..... | 8.5 | 4.9 | 4.2 | 24.4 | 23.8 | 22.5 |
| Illinois River..... | 8.1 | 12.8 | 13.0 | 17.1 | 20.6 | 30.2 |
| Port of Chicago..... | 6.1 | 7.1 | 8.0 | 25.8 | 18.4 | 29.4 |
| | 14.7 | 5.7 | 1.3 | 55.9 | 85.8 | 87.0 |
| All origins..... | 7.0 | 7.9 | 7.4 | 45.7 | 44.2 | 47.7 |

¹ Includes corn, soybeans, wheat, rice, barley and rye, oats, and grain sorghums.

² Receipts terminating on the Mississippi River from the mouth of the Missouri River to the mouth of the Ohio River.

³ Includes receipts on the Wolf River, Tenn., and the Mississippi River from the mouth of the Ohio River, to, but not including, Baton Rouge, La.

⁴ Includes receipts on the Mississippi River from and including Baton Rouge, La., to, but not including, New Orleans, La.; New Orleans, La., to mouth of passes; and Gulf Intracoastal Waterway, Caloosahatchee River, Fla., to the Mexican border.

⁵ Intraport movements are not shown.

Derived from Waterborne Commerce of the United States, Department of the Army, Corps of Engineers, Supplement to Part 5, calendar years, 1956-58.

of total shipments of oats and barley increased. In 1954, lake movement of oats was about 12 percent of total shipments and in 1958 about 76 percent. The percentage of barley moved on the lake jumped from 26 percent in 1954 to 62 percent in 1958.

Lakes Michigan, Huron, and Erie Market Area

Not all of the terminal elevators in this market area had facilities available for water shipment, either lake boat or barge. Feed grains made up the major volume moving through these terminals. Destined for Canada or domestic processing plants and feeding areas, a relatively small percentage of the grain was shipped by water. In any one year water shipments were limited to around 25 percent or less of the total grain traffic (table 39). Water movement was divided about equally between corn, soybeans, and wheat in 1958. Practically all other movement was by rail. In each of the years 1954-57 truck shipments made up less than 1 percent of the total, but in 1958 there was a marked gain in

truck volume--to 2.4 percent of all shipments. Practically all trucked volume was confined to the major feed grains, corn and oats.

Western Interior Market Area

The annual volumes of grain shipped by Western Interior terminals increased substantially each year over the previous year's volume. Although wheat accounted for at least two-thirds of total shipments in each of the 5 years, the relative percentage fell from over 80 percent of all grain shipments in 1954 to 67 percent in 1958. During this 1954-58 period, the relative volume of corn increased from 11 percent to 13 percent and the volume of sorghums for grain from 5 percent to more than 17 percent. This may be attributed to the increased production of these feed grains, brought about by the expanding poultry and cattle feeding industries' drawing grain from these western markets.

Most of the grain was shipped from Western Interior terminals by rail and moved comparatively long distances. It is economically attractive to the terminal operators to use rail as their primary carrier because of the favorable transit privilege. Scarcity of processing plants for grain near these western terminals results in less extensive use of trucks, with their short-haul advantages.

Truck movement was confined largely to the movement of coarse grains. As the total shipments of these grains increased in 1954-58, the relative share moving by truck diminished. In 1954, 20 percent of the corn was shipped by truck. This percentage dropped each year until only 3 percent of the 1958 volume moved by truck. In 1957, the trucks moved over 43 percent of the sorghums for grain. Rail rate adjustments and greatly increased volume in 1958 brought the truck share down to slightly over 1 percent.

Central Interior Market Area

The volume of grain shipped by Central Interior terminals also increased substantially from one year to the next. Corn was the principal grain handled each year, accounting for 63 percent of the shipments in 1954 and increasing to 85 percent in 1958. Soybeans and oats accounted for nearly all of the remaining movement, except for insignificant quantities of wheat, barley, and sorghums for grain. A deviation from this trend is noted for 1956, when some 6 million bushels of wheat, about 20 percent of the total grain shipments from this area were shipped. This extreme variation possibly may be due to Government holdings released from storage or shipped out for storage elsewhere.

Grain shipments by truck increased. Trucks moved just over 1 percent of the grain in 1954, but by 1958 their volume had increased to more than 21 percent of all shipments. The random sampling technique used to gather the primary data resulted in an unusually heavy weight being given to terminals located within a relatively short haul of the Great Lakes. These terminals commonly move grain by truck to lake ports for transfer to lake vessels; therefore, the truck percentages may be somewhat overstated for this area. However, the relative volumes of grain shipped by truck did increase from year to year, especially from those terminals located near processors or port outlets for grain. The railroads hauled proportionately less grain each year, 1954-57, but predominated in the long hauls. In 1958 the relative rail share of shipments jumped about 6 percentage points and the trucks' share declined correspondingly.

Eastern Interior Market Area

Until 1958, the volume of grain handled by Eastern Interior terminal elevators rose each succeeding year. However, total shipments in 1958 dropped to 109 million bushels, 21 percent below the 138 million bushels shipped in 1957. Corn shipments were down 27 million bushels, soybeans almost 2 million, and oats 8 million bushels; wheat shipments rose 8 million bushels.

The increased traffic moving from on-water terminals contributed to the declining volume handled at interior markets. Although 1958 grain production in Illinois, Indiana, and Ohio was 16 percent above 1957 (table 1), the volume of grain originating on the Illinois and Ohio Rivers in 1958 was 23 percent above 1957. This indicates that grain previously moving to interior markets probably was directed to river outlets in 1958.

It is also significant that the 1958 decline occurred in the movement of feed grains. The southeastern feeders normally draw a considerable volume of these grains from the area north of the Ohio River. In 1958, an estimated 55 to 60 million bushels of grain moved by truck into the Southeast directly from farms and country elevators normally supplying the Eastern Interior terminals (81). This unusually high volume, brought about by poor crops in the Southeast in 1957, undoubtedly accounted for most of the decline in volume handled by terminal elevators.

Grain shipped from the Eastern Interior terminals moved primarily by rail. However, truck shipments gained slightly in importance over the 5-year period. Trucks handled less than 1 percent of the total in 1954. This percentage averaged about 1.5 for 1955-57, but jumped to almost 4 percent in 1958. Of the 4 million bushels of grain trucked from Eastern Interior terminals in 1958, over 3 million were corn, probably destined for nearby processing plants or Great Lakes outlets.

Barge Shipments of Grain to Selected Destinations, 1956-58

Within the confines of the North Central Region is a network of inland waterways developed and maintained by the Corps of Engineers, U.S. Army (fig. 16). For many years these inland waterways were of minor importance as far as the movement of grain was concerned, but in recent years more and more grain is being moved by barge. The channels serving the North Central Region include the Mississippi River, the Illinois Waterway, Missouri River, Ohio River, and tributaries. Through these channels, grain can be shipped to Chicago for movement on the Great Lakes, to lower Mississippi River ports such as Memphis, Baton Rouge, and New Orleans, and to Tennessee River ports. Grain can move to Chicago, Baton Rouge, or New Orleans for export overseas.

Total barge shipments of grain from origins located along commercially navigable inland rivers in the North Central Region increased 60 percent over a 3-year period, from 4.1 million short tons in 1956 to about 6.6 million tons in 1958. The Illinois River accounted for 36 percent of total barge shipments in 1958; the Upper Mississippi River and its tributaries accounted for almost 34 percent.

Of the total barge shipments of grain from Illinois River origins, Chicago received 46.5 percent, and Baton Rouge, New Orleans, and the Gulf ports received over 29 percent in 1958 (table 40). In 1956, Chicago received 64 percent of shipments originating on the Illinois River, and Baton Rouge, New Orleans, and Gulf ports received almost 26 percent. The Tennessee River, which received less than 3 percent of the Illinois River shipments in 1956, received over 14 percent in 1958.

Of total waterway shipments from origins in the North Central Region, receipts at Tennessee River ports increased from over 13 percent in 1956 to about 25 percent in 1958. The bulk of these receipts, 58 percent, were from the Mississippi River north of the mouth of the Ohio River, and of this movement 65 percent came from north of the Missouri River mouth.

Baton Rouge, New Orleans, and Gulf ports were the major markets for barged grain from the North Central Region, receiving about 48 percent of total shipments in 1958. Forty-three percent of the barged grain receipts at these lower Mississippi and Gulf ports were shipped from the Mississippi River north of the mouth of the Missouri River. The portion of the Mississippi River from the mouth of the Missouri River to the mouth of the Ohio River, including the port of St. Louis, received only 2 percent of total barge shipments

from the North Central Region in 1958, but shipped almost 17 percent of the total barge volume. Baton Rouge, New Orleans, and Gulf ports received about 59 percent of total St. Louis shipments.

The Missouri and Ohio Rivers and the Port of Chicago shipped 13.5 percent of total 1958 barge shipments from the North Central Region. Over the 3-year period, 1956-58, the proportion of barged grain going to Chicago from the Missouri River declined and increased proportions went to the Tennessee River, Memphis, and the Gulf. Ohio River grain traffic moved principally to the Tennessee River. Barged grain from Chicago moved principally to the Gulf; the proportion going to Tennessee River ports declined in 1956-58.

Grain Receipts and Shipments at Selected Markets, 1954-59

From statistics published by boards of trade and grain exchanges, data in figures 29 and 30 have been compiled for six major markets. The data include both Government and nongovernment grain and reflect the volume moving to these markets as first destinations as well as volumes received from other terminal markets (17).

Duluth, Minn. -Superior, Wis.

Total grain receipts at Duluth-Superior from all shipping origins amounted to 159 million bushels in 1959, an increase of 25 percent over 1958. Rail receipts accounted for 94 percent of total receipts in 1954 and 84 percent in 1959. Truck receipts, which were less than 1 percent in 1954, increased to 14 percent of total receipts in 1959. Receipts by lake, largely from Canada, decreased by about two-thirds during the 6-year period.

Reflecting the opening of the St. Lawrence Seaway in 1959, shipments from Duluth-Superior for all grains by all modes of transport increased 39 percent between 1958 and 1959 to a 6-year high; shipments from this market had declined between 1956 and 1958. Shipments by lake in 1959 were about 140 million bushels, an increase of 54 percent over 1958 and 85 percent of total 1959 shipments.

Chicago, Ill.

Chicago's total grain receipts in 1959 were 7 percent less than receipts in 1957 and 11 percent less than in 1958. Before 1959, total grain receipts at Chicago had increased steadily from about 188 million bushels in 1954 to about 234 million in 1958. Rail receipts in 1959 dropped 18 percent below 1958; truck receipts increased 56 percent; barge and lake boat receipts decreased 15 percent. Truck receipts increased in 1959 to a 6-year high of close to 31 million bushels. Although barge and lake boat receipts together declined, lake boat receipts alone increased from 1958 to 1959, reaching a high of about 9 million bushels in 1959.

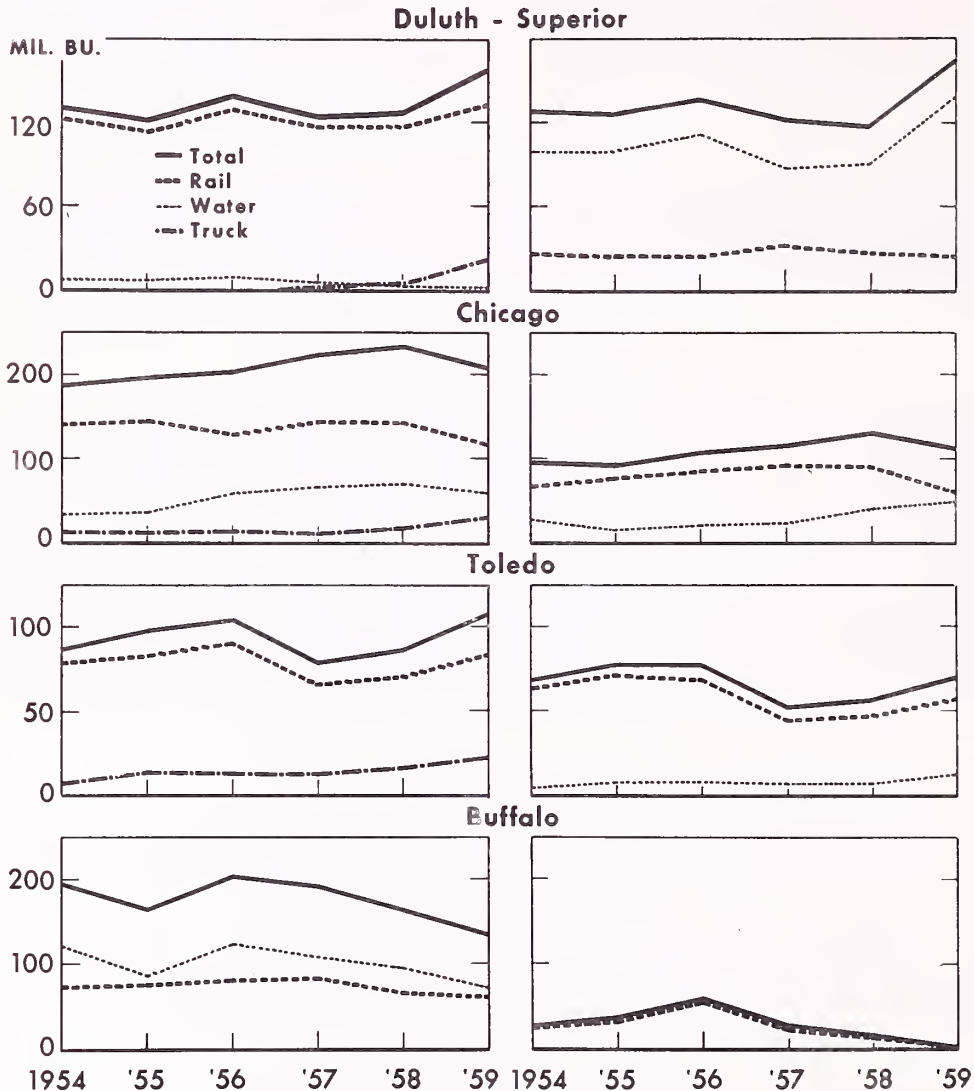
Shipments from Chicago decreased 13 percent from about 132 million bushels in 1958 to 114 million bushels in 1959, the lowest since 1956 when shipments were only 108 million bushels. With the Seaway opening, lake shipments increased, but at the expense of other modes of transport. While Chicago's lake shipments increased from 29 million bushels in 1958 to over 49 million bushels in 1959, rail shipments dropped 31 percent.

Chicago is a major grain processing center. About 103 million bushels of grain were processed or consumed in Chicago in 1958, and about 86 million bushels were used locally in 1959. Local use accounts for the wide variations between total grain receipts and shipments.

MOVEMENT OF GRAIN AT SELECTED MARKETS, BY MODE OF TRANSPORT

RECEIPTS

SHIPMENTS



Boards of trade in specified cities.

U.S. DEPARTMENT OF AGRICULTURE

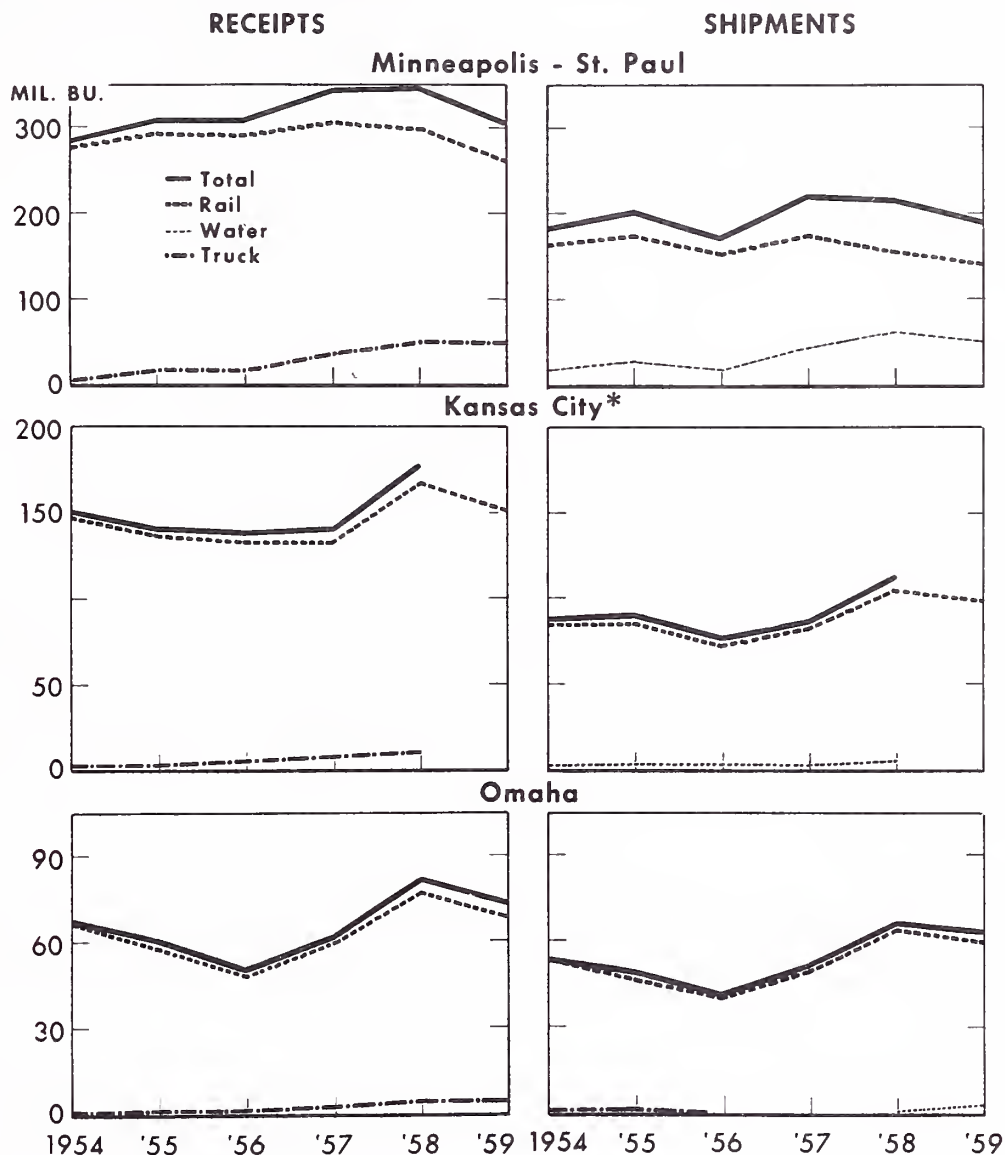
NEG 0377-01 (1) AGRICULTURAL MARKETING SERVICE

Figure 29

Toledo, Ohio

At Toledo, total grain receipts in 1959 were 24 percent above 1958, and were the highest for the 6-year period, 1954 through 1959. Rail receipts fluctuated about the same as total receipts, but the relative share varied from year to year. In 1954, rail accounted for 91 percent of total receipts, but in 1959 accounted for less than 80 percent of total receipts. Trucks accounted for most of the remaining receipts. Receipts by lake boat did not exceed 1 percent in any one year.

MOVEMENT OF GRAIN AT SELECTED MARKETS, BY MODE OF TRANSPORT



* Only rail movement available for 1959.

Grain exchanges or boards of trade in specified cities.

U.S. DEPARTMENT OF AGRICULTURE

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Figure 30

Shipments from Toledo were highest in 1955, reaching a peak of 79 million bushels, but declined to 52.5 million by 1957. Fifty-seven million bushels were shipped in 1958, and a further increase of 26 percent in 1959 upped shipments to about 72 million bushels. Rail carriers hauled 94 percent of the shipments from Toledo in 1954 and 81 percent in 1959. The Seaway influence is reflected in increased lake shipments of 83 percent between 1958 and 1959.

Buffalo, N. Y.

Both rail and lake boat receipts in 1959 dropped to a new low for the 6-year period beginning in 1954 (5). Total receipts for 1959 were 32 percent below 1954 receipts. Lake boat receipts declined from about 124 million bushels in 1954 to 72 million in 1959. Receipts by lake boat in 1959 were influenced by the opening of the St. Lawrence Seaway. The Seaway permitted shipments directly overseas from ports on the Lakes, by-passing Buffalo. Rail receipts continued to rise from about 75 million bushels in 1954 to about 83 million bushels in 1957 before declining to a 6-year low of 62 million bushels in 1959.

After increasing from 28 million bushels in 1954 to 59 million bushels in 1956, shipments from Buffalo declined to a 6-year low of less than 4 million bushels in 1959. Total shipments dropped 54 percent between 1956 and 1957, and 78 percent between 1958 and 1959. In 1959 rail shipments had declined 95 percent from 1956, and barge shipments had dropped 55 percent. Buffalo is another major grain processing center.

Minneapolis-St. Paul, Minn.

Grain receipts at Minneapolis-St. Paul increased 23 percent from 1954 through 1958, but declined substantially in 1959, dropping 11 percent below 1958 receipts. (Data for this market include trucked grain received at weighing stations at Red Wing, Hastings, Savage, New Ulm, and Lakeville, Minn.) Most significant were truck receipts, which jumped from about 6 million bushels in 1954 to about 49 million in 1959. Truck receipts were 2 percent of total receipts in 1954, and 16 percent in 1959. Receipts of all grains by rail and truck increased from 283 million bushels in 1954 to about 348 million in 1958, and then dropped to 309.5 million in 1959.

Minneapolis-St. Paul shipped more grain than any other market, most of it by rail, and the remainder by barge. Rail accounted for 73 percent of total shipments in 1959, compared with 89 percent in 1954. Barge shipments from Minneapolis, St. Paul, Savage, and Red Wing increased from 10 percent of the total in 1954 to 27 percent in 1959. Comparative grain receipts and shipments indicate the importance of this market as a grain processing center.

Omaha, Nebr.

Receipts at Omaha amounted to 73 million bushels of grain in 1959, an increase of 9 percent over 1954, but 10 percent below 1958. Rail receipts accounted for 98 percent of the grain hauled into Omaha in 1954 and 94 percent in 1959. Truck receipts increased from just over 1 million bushels in 1954 to 4.5 million in 1958 and dropped slightly in 1959.

Shipments from Omaha increased 25 percent from 1954 to 1958, although 1954 shipments were greater than in 1955 through 1957. Between 1958 and 1959, shipments declined from 67 million to about 64 million bushels. Shipments in 1958 were 31 percent above 1957, 65 percent above 1956, and 5 percent above 1959 shipments. Of the 1959 shipments, less than 1 percent was by truck, about 5 percent was by barge, and the remainder was shipped by rail. In 1954, about 0.5 percent of total shipments were by truck and barge combined.

Influence of Rates on the Mode of Transport Employed by Terminal Elevators

Rail Transit Privileges

Terminal elevator operators interviewed in 1958 were asked to state the degree of importance they attached to transit privileges, whether none, minor, or major, and whether the relative importance had increased, decreased, or remained the same during recent years. Statements were indicated on 90 of the 93 acceptable questionnaires:

| | <u>Operators reporting</u> |
|---|----------------------------|
| Transit privileges are-- | |
| Not important | 6 |
| Of minor importance | 4 |
| Of major importance | 80 |
| During recent years, relative importance of transit privileges has-- | |
| Increased | 16 |
| Decreased | 6 |
| Remained the same | 68 |

Derived from Grain Transportation Statistics for the North Central Region, table 84 (17).

The 10 elevators for which the operators indicated transit privileges to be of minor or no importance to their operation were located at on-water sites in the Upper Mississippi River, Lower River, or Lake Superior market areas. Operators of another 21 elevators in these areas and 59 elevators in the remaining terminal market areas felt that transit privileges were of major importance to their business.

Use of rail transit privileges allows storage and milling or other processing between origin and destination. Too, rail tariffs permit transit at out-of-linepoints, enabling terminals in numerous markets to serve similar producing and consuming areas. Transit privileges become less significant where competitive modes of transport are available, and then only when no particular transit service is desired.

Over 75 percent of the terminal elevator operators stated that the relative importance of transit privileges had remained the same, about 18 percent indicated the relative importance had increased, and about 7 percent stated that the relative importance had decreased. Those elevators reporting the decrease in relative importance were equally divided between interior and river locations. Those at interior locations were in the Central and Eastern Interior market areas, where truck transportation had greatly increased. The elevators located on the rivers had in recent years added or improved barge facilities.

Twelve of the sixteen terminal elevators indicating increased relative importance of transit privileges were located in the Lakes Michigan, Huron, and Erie area and the Western Interior area; they represented about one-third of the total elevators reporting from the two areas. The remaining 4 elevators were located in various other areas of the North Central Region.

Rail Rate Changes

Because of the very nature of their business, the terminal elevators were less sensitive to rail rate changes than the country elevators were. Some terminals were dependent solely on one mode of transport for receipt or shipment of grain. Others were limited in their choice by buyers' preferences. Generally, the result of rate fluctuations was most noticeable in the receipt of grain, reflecting to some extent the greater sensitivity of the country points to rate changes.

Increases. --The shift from rail to other forms of transportation for both inbound and outbound grain at terminal elevators was most apparent in the Lakes Michigan, Huron, and Erie and Eastern Interior market areas. As may be seen on page 70, table 30, footnote 3, country elevator traffic areas served by these terminal points were among those most active in the switch from rail because of rate increases. Reflecting the country elevator shift, 16 of 19 terminal elevators interviewed in the 2 market areas indicated a greater proportion of truck receipts with each rail rate increase.

Terminal elevator operators throughout the North Central Region gave about the same comments regarding the effects of rail rate increases since 1946. Although there were rate increases by all modes of transport, the percentage increases in rail rates widened the differentials between rail and water or truck charges to the point that rail transportation was economically impossible in some cases.

Rail transit privileges were a major factor limiting shifts to truck or water for grain received by terminal elevators. With the major share of their business with grain processors, the elevators could not sell grain received by truck unless truck or water transportation was available and acceptable to the buyer.

Overall, less than 38 percent of the terminal elevator operators interviewed reported any decline in the proportionate share of grain received by rail in recent years, and less than 36 percent reported any decline in the share shipped by rail.

Reductions. --There was some indication by the terminal elevators that certain selective rail rate reductions into key terminal markets would result in more traffic for the railroads.

Those elevators which had previously resisted any shift from rails continued to utilize them, with no appreciable increase in the proportion of grain moving by rail. Elevators with substantial investments in truck or water facilities were reluctant to shift traffic away from these facilities. The amounts of these reductions in rail rates would, of course, also have been a factor. For these reasons, only 15 of the 82 elevators responding indicated any return to, or any increase in, rail movement.

This increased rail movement was most noticeable in the inbound movement, resulting, no doubt, from the more ready response of the country elevators to the rate reductions. Only five terminal elevators reported any proportionate increase in rail shipments subsequent to applicable rail rate reductions.

Service Factors Influencing Mode of Transport Employed by Terminal Elevators

Availability of Transport Equipment and New Markets

Terminal elevator operators were asked whether various types of transport equipment were more readily available in 1958 than 5 years before, and if so, whether the greater availability had enabled them to reach new markets.

About 34 percent of the terminal elevators reported rail cars more readily available in 1958 than in past years, over 96 percent reported trucks more readily available, and 80 percent of those elevators with access to barges reported greater availability of barges. Improvement in availability of rail cars was most evident in the Lower River and Central Interior areas. Forty-seven percent of the terminal elevators reported availability of transport equipment had provided new grain markets, but this response was heaviest in the Lower River and Upper Mississippi River areas where all of the on-water elevators reported greater availability of barges.

Advantages and disadvantages of different modes of transport were reported by 68 terminal elevators in the North Central Region, or 73 percent of the 93 elevators returning usable questionnaires. Tables 41-44 show the advantages and disadvantages in order of the number of times reported, by mode of transport.

Advantages and Disadvantages of Rail Transportation

Each of two advantages were reported by about one-third of the responding terminal elevators. These advantages were (1) availability of transit privileges and (2) facilities generally designed for rail movement to provide economical plant operation (table 41).

In the Interior areas, one-half of the terminal elevators considered transit privileges as an advantage. Sixty percent of these replies were from Western Interior elevators. Of the responding elevators in the two Great Lakes areas, 42 percent indicated the rail transit privilege as an advantage. About 60 percent of the elevators in the Lakes Michigan, Huron, and Erie area reported the advantage of rail transit privileges compared with 20 percent in the Lake Superior area. This indicates that rail transit privileges are regarded as relatively more important in this 3-lake area than in the Lake Superior area. Only 17 percent of the terminal elevators in the river areas reported this advantage.

The advantage "facilities generally designed for rail movement to provide economical plant operation" was reported by 21 terminal elevators in the North Central Region. Over one-half of those elevators responding from the Interior areas indicated this advantage.

Other rail advantages were reported by the terminal elevator operators: Constant availability of service; highly suited to large shipments; official weights and grades provided; ease of loading; consignees equipped to receive shipments by rail only; and, rail cars available when needed.

Two advantages--constant availability of service and rail cars available when needed--were indicated by one-third of the terminal elevators in the Upper Mississippi River area. Almost 27 percent of those replying from the Western Interior indicated the advantage "official weights and grades are provided."

The disadvantage given more times than any other was that rail cars were not available when needed; 17 elevators gave this disadvantage. Over 50 percent of the respondents in the Lakes Michigan, Huron, and Erie area, as well as 44 percent of those in the Missouri River area, indicated this disadvantage. Rail car shortages were reported as a disadvantage in all areas except the Upper Mississippi River and Central Interior areas.

The disadvantage "high cost of transportation (rates)" was reported by 80 percent of the terminal operators in the Lake Superior area and 33 percent of those in the Eastern Interior area. Other rail disadvantages given in the replies of 68 terminal elevator operators included the following: Too slow in transit (22); poor condition of cars; inadequate switching service; cannot economically serve secondary markets; high claims ratio per carload shipped; and inadequate trackage to handle shipping demands.

Advantages and Disadvantages of Trucks

Out of 93 terminal elevators, only 38 reported any grain shipments by truck, and 35 of the 93, including some that did not ship grain by truck, reported advantages and disadvantages.

Terminal elevators in the North Central Region reported 12 advantages for shipping grain by truck (table 42). The 3 reported most often were the following: (1) Provides a way to market less-than-carload lots, (2) speed in transit, and (3) cost of transportation is low (rates).

TABLE 41.--Advantages and disadvantages of rail transportation, as reported by terminal elevators in North Central Region, 1958

| Advantages | Elevators reporting | Disadvantages | Elevators reporting |
|---|------------------------|--|------------------------|
| | <u>Number</u> | | <u>Number</u> |
| Availability of transit privileges..... | 23 | Rail cars not available when needed..... | 17 |
| Facilities generally designed for rail movement to provide economical plant operation.... | 21 | High cost of transportation (rates)..... | 13 |
| Constant availability of service | 9 | Too slow in transit..... | 8 |
| Highly suited to large shipments | 7 | Poor condition of rail cars..... | 7 |
| Official weights and grades are provided..... | 6 | Inadequate switching service.... | 6 |
| Ease of loading..... | 5 | Cannot economically serve secondary markets..... | 4 |
| Consignees equipped to receive shipments by rail only..... | 5 | High claims ratio per carload shipped..... | 4 |
| Rail cars available when needed. | 5 | Inadequate trackage to handle shipping demands..... | 3 |
| Large load capacity per unit of equipment..... | 4 | Delays involved while awaiting inspections..... | 1 |
| More volume loaded per hour than any other mode..... | 3 | Not properly equipped to mix or blend grain while loading..... | 1 |
| More accurate shipping schedules | 3 | Excessive bookkeeping involved.. | 1 |
| Good switching service..... | 3 | Slower to load than lake boat... | 1 |
| Uniformity of equipment promotes faster loading..... | 3 | Excessive number of car units required per volume shipped compared to lake boat..... | 1 |
| Flexibility in adjusting to small volume shipment compared to barge..... | 3 | Inadequate grading methods..... | 1 |
| Official weights and grades provides accurate basis for claims arising from loss in transit..... | 2 | Poor service in general..... | 1 |
| Use of rail cars requires less labor (cheaper)..... | 2 | | |
| Other..... | 10 | | |

From Grain Transportation Statistics for the North Central Region, tables 78 and 79 (17).

TABLE 42.--Advantages and disadvantages of truck transportation, as reported by terminal elevators in North Central Region, 1958

| Advantages | Elevators reporting | Disadvantages | Elevators reporting |
|--|---------------------|--|---------------------|
| | <u>Number</u> | | <u>Number</u> |
| Provides a way to market less-than-carload lots..... | 10 | Load capacity of truck unit is too small..... | 7 |
| Speed in transit..... | 9 | Lack of transit privileges..... | 4 |
| Cost of transportation is low (rates)..... | 6 | Slow loading process..... | 4 |
| More flexibility..... | 4 | Not properly equipped for loading..... | 4 |
| Grain loss and damage claims are at a minimum..... | 4 | Not economical for large shipments..... | 3 |
| Ease of loading..... | 3 | Loading of trucks too expensive. | 3 |
| Better prices obtained on truck shipments..... | 3 | Poor loading schedules..... | 3 |
| Provides access to buyers not located on rail sidings..... | 2 | Spasmodic supply of haulers..... | 2 |
| Small nontransit consignments can move outbound by motor carriers..... | 1 | Seasonal operating difficulties due to weather conditions..... | 2 |
| Highly suited to short-haul operations..... | 1 | Loss of mixing profit..... | 2 |
| Broadens the range of marketing outlets..... | 1 | Cost of transportation higher than barge (rates)..... | 1 |
| Good service in general..... | 1 | Generally limited to short-haul operations..... | 1 |
| | | High rates on some long hauls... | 1 |
| | | Delay in obtaining official grades..... | 1 |
| | | Grain shipments not inspected... | 1 |
| | | Equipment not uniform..... | 1 |
| | | Shipments are not sealed..... | 1 |
| | | Demand for different grains and different qualities of grain by truckers increase loading costs..... | 1 |

From Grain Transportation Statistics for the North Central Region, tables 80 and 81 (17).

Forty-three percent of the respondents from the Missouri River and Upper Mississippi River areas and about 29 percent of the elevators located in Interior areas gave the advantage, "Provides a way to market less-than-carload lots."

"Speed in transit," was reported by more than one-third of the elevators located in the Lakes Michigan, Huron, and Erie and Eastern Interior areas as an advantage for using trucks. The advantage "cost of transportation is low" was reported by about one-fourth of the elevators in the Western Interior area.

Of the disadvantages for shipping grain by truck reported by the terminal elevators, the following were reported most frequently: "Load capacity of truck unit is too small, lack of transit privileges, slow loading process, and not properly equipped for loading trucks."

Advantages and Disadvantages of Barges and Lake Vessels

Advantages for shipping grain by barge were reported by 20 terminal elevators (table 43). All were located in the river and Great Lakes areas with the exception of one elevator in the Eastern Interior. This elevator trucked outbound grain to a nearby river point for transfer to barge.

The low cost of transportation was the most important advantage according to number of times reported. Other advantages included "highly suited to volume shipments," and "can reach interior river markets more economically than overland transport," reported by elevator operator in the Lower Rivers and Great Lakes areas.

TABLE 43.--Advantages and disadvantages of barge transportation, as reported by terminal elevators in North Central Region, 1958

| Advantages | Elevators reporting | Disadvantages | Elevators reporting |
|---|------------------------|--|------------------------|
| | <u>Number</u> | | <u>Number</u> |
| Cost of transportation is low (rates)..... | 17 | Operation limited to navigation season..... | 3 |
| Highly suited to volume ship- ments..... | 5 | Spasmodic supply of barge units..... | 3 |
| Can reach interior river markets more economically than over- land transport..... | 2 | Slow in transit..... | 2 |
| Equipped to provide suitable grain mixes and blends..... | 1 | Limited markets..... | 2 |
| Claims for grain loss and dam- age are at a minimum..... | 1 | Poor loading schedules..... | 1 |
| Fast loading..... | 1 | | |

From Grain Transportation Statistics for the North Central Region, table 82 (17).

All of the terminal operators reporting barge disadvantages from the Missouri River area stated that barges were not always available. Two-thirds of the reporting elevators in the Lakes Michigan, Huron, and Erie area indicated that barge operation is limited to the navigation season. Other barge disadvantages were "Slow in transit," "limited markets," and "poor loading schedules."

Advantages and disadvantages of lake vessels were reported by eight terminal elevators located in the Great Lakes areas. Seven of the elevators indicated low rates as an advantage (table 44). The following disadvantages were reported most often: Operation limited to navigation season and limited markets by lake vessel. Only 5 terminal elevators reported any disadvantage of lake vessels.

Resulting Shifts in Mode of Transport Employed

Terminal elevator operators in the North Central Region were asked whether the quality of service provided by various carriers had influenced them to change from their usual type of transportation for grain shipments. Of the 93 terminal elevators returning usable questionnaires, 9 answered yes, 72 answered no, and 12 failed to respond. The elevators replying affirmatively were located in four areas: Missouri River, Lakes Michigan, Huron, and Erie, Western Interior, or Eastern Interior.

In the Missouri River area, two operators stated that the quality of service provided by the different carriers had caused them to shift from their usual carrier. These elevator operators stated that better and quicker service was available from motor carriers.

Three terminal elevators in the Lakes Michigan, Huron, and Erie market area reported that they had shifted to greater use of lake vessels because railroads were unable to supply rail cars at the proper time, even under contract. Lake vessels have become more competitive as lake facilities have expanded.

TABLE 44.--Advantages and disadvantages of lake vessel transportation, as reported by terminal elevators in North Central Region, 1958

| Advantages | Elevators reporting | Disadvantages | Elevators reporting |
|---|---------------------|---|---------------------|
| | <u>Number</u> | | <u>Number</u> |
| Low cost of transportation (rates)..... | 7 | Operation limited to navigation season..... | 4 |
| Highly suited to large shipments. | 4 | Limited markets..... | 4 |
| Vessel equipped to handle several grains satisfactorily.... | 1 | Not suited to small shipments.. | 2 |
| Claims for loss and damage are at a minimum..... | 1 | Rates fluctuate..... | 1 |
| Fast loading..... | 1 | Poor loading schedules..... | 1 |
| Cost of loading grain into boats is low..... | 1 | Low water delays loading..... | 1 |

From Grain Transportation Statistics for the North Central Region, table 83 (17).

In the Western Interior, two terminal elevators reported that better equipment, such as special covered hopper cars which are unloaded by an aeration process, were becoming available for handling bulk flour (40). Other comments were that boxcar shortages and poor equipment had caused shifts to truck.

Two operators in the Eastern Interior said that they had changed their usual type of transportation. Curtailment of daily switching service to three times a week at country elevators had increased the length of time in transit. They said that grain received by rail from country elevators 50 or 60 miles away took longer in transit than a shipment by truck from the terminal elevator to the Atlantic seaboard. Other reasons for changing from rail to truck were scarcity and bad condition of rail cars, and the lax, uncooperative attitude of some railroad employees.

GRAIN TRANSPORTATION DEVELOPMENTS SINCE 1958

The diversion of grain from the railroads to other modes of transport appears to have been accentuated by the opening of the St. Lawrence Seaway late in April 1959. Ports on the Great Lakes gained access to world ports, and for the first time, large deep-draft ocean-going vessels called at Chicago, Duluth-Superior, Toledo, and other ports for grain cargo (79). Although the minimum depth was 27 feet in 1959 from Lake Erie through the Welland Canal and Lake Ontario, and from there on through the Seaway and St. Lawrence River to the Atlantic Ocean, water depths at the harbors and in the connecting channels between the Upper Great Lakes were considerably less (32). This shallowness resulted in vessels taking on less than full cargoes and topping-off with grain at lower St. Lawrence River ports. Grain required for topping-off, as well as to meet demand for full grain cargoes at lower St. Lawrence River ports, was transported from the Great Lakes ports in smaller vessels or in lake vessels.

Some 87 million bushels of United States grain moved directly overseas from ports on the Great Lakes in 1959; another 26.7 million bushels were transshipped from Montreal and other lower St. Lawrence River ports (17). The estimated 113.7 million bushels of U.S. grain that moved overseas by the Seaway during 1959 is more than 60 times the U.S. shipments in 1958 by the restricted St. Lawrence Canals. About 24.5 million bushels of U.S. grain moved to Canada from ports on the Great Lakes in 1959. Of the more than 138 million bushels exported overseas and to Canada, corn made up 31 percent; oats, 23 percent; barley, 18 percent; soybeans, 13 percent; wheat, 9 percent; flaxseed, 5 percent; and rye, less than 1 percent. About 80 million bushels moved from lake ports to U.S. destinations, principally to Buffalo via the Great Lakes. The total grain movement from our Great Lakes ports in 1959 was over 218 million bushels.

About 973 million bushels of U.S. grain were inspected for export in 1959 at all U.S. ports, some 166 million bushels over 1958 (table 28). However, Atlantic and Pacific ports failed to maintain their relative volumes, each dropping over 5 percent. In both years, Gulf ports handled about 52.5 percent of the total grain exports, and the lake ports' share increased from just under 4 percent in 1958 to over 14 percent in 1959. The volume of grain inspected for export in 1959 decreased at Albany, Philadelphia, and Norfolk.

Buffalo's lake receipts declined from about 98 million bushels in 1958 to slightly over 73 million in 1959, or 26 percent (fig. 29). This included a decrease in receipts of 16 million bushels from Duluth-Superior, 1.5 million bushels from Chicago, and about 6 million from Canada (5). Rail receipts at Buffalo in 1959 declined about 7 million bushels, or 10 percent, from the 69.5 million bushels received in 1958. Shipments of ex-lake grain (grain received by lake) from Buffalo by rail to Atlantic ports for export fell precipitously from 1957 to 1959. From a total of 25 million bushels in 1957, the volume fell 40 percent, to 15 million bushels in 1958. In 1959, shipments were only 17 percent of the 1958 total.

After the opening of the Seaway, greater volumes of grain moved into lake ports by truck. Receipts of trucked grain at Duluth-Superior increased from less than 5.5 million bushels in 1958 to nearly 23 million bushels in 1959 while total grain receipts increased from 127 to 159 million bushels (fig. 29). In 1956, truck and barge receipts of grain at Chicago were just over 35 percent of total grain receipts. In 1959, trucks and barges together accounted for almost 40 percent of total grain receipts, but barge volume had declined and truck volume had increased. The rail share of total receipts declined from 75 percent in 1954 to 57 percent in 1959. Chicago's total receipts declined from about 244 million bushels in 1958 to 208 million bushels in 1959. Total receipts at Toledo increased from about 87 million bushels in 1958 to over 107 million in 1959; rail receipts advanced 21 percent while truck receipts jumped over 35 percent.

Comparative 1958 and 1959 statistics indicate lowered production of some grains in the tributary area and the Seaway's effect on grain receipts and shipments at the Minneapolis market (fig. 30). In 1959, receipts declined 38 million bushels from the 1958 total. Rail receipts declined 37 million bushels, or nearly 13 percent, while truck receipts declined slightly from the 49 million bushel total for 1958. Receipts of oats declined about 15 million bushels; wheat, 18 million; corn, about 3 million; and soybeans, about 3 million. Barley receipts were about the same each year. Except for soybeans, truck receipts of all grains held their own or increased from 1958 to 1959. Soybean receipts by truck declined over 4 million bushels.

Between 1958 and 1959, barge shipments of selected grains from Minneapolis, St. Paul, Savage, and Red Wing, Minn. dropped from 62 million bushels to 52 million (fig. 30). While barge shipments of wheat increased, barge shipments of other grains, particularly oats, soybeans, and corn, decreased. Rail shipments of corn dropped more than 10 million bushels, and rail shipments of oats were about 8 million bushels under 1958. Rail shipments of soybeans in 1959 were about the same as in 1958, but rail shipments of wheat and barley increased.

At Duluth-Superior, which draws grain from the same general area as the Minneapolis market, grain receipts increased 32 million bushels in 1959, as noted above (fig. 29). Corn volume rose from 9.5 to over 15 million bushels; oats from about 13 to over 35 million; barley from 21 to 31 million; and soybeans from practically none in 1958 to over a million bushels in 1959. Wheat receipts declined from about 84 million bushels in 1958 to 77 million in 1959. Increased receipts of corn and oats at Duluth-Superior in 1959 probably resulted in smaller volumes of these grains at Minneapolis.

Water transportation from the Minneapolis and Duluth-Superior markets has secured a greater share of the total grain shipments in recent years. This share rose from 39 percent in 1957 to over 45 percent in 1958 and to about 54 percent in 1959. From Chicago, comparative shares shipped by water rose from 20 percent in 1957 to 31 percent in 1958, and to 45 percent in 1959 (fig. 29).

To meet the competition of trucks, inland waterways, and the Seaway, the railroads reduce rates wherever they believe competition warrants (89).

The passage by Congress of the Transportation Act of 1958 (71) may have resulted in a greater emphasis on carrier costs of moving freight as criteria for establishing rail rate levels (28). The Rule of Rate Making, Sec. 15a (3), of Part I of the Interstate Commerce Act, states that "Rates of a carrier shall not be held up to a particular level to protect the traffic of any other mode of transportation, giving due consideration to the objectives of the national transportation policy declared in this Act." The U. S. Department of Commerce issued in 1960 a transportation policy report which emphasizes carrier costs as a guide in establishing rates (67), and the Interstate Commerce Commission published an extensive report on the value of service in rate making (70).

Since passage of the Transportation Act of 1958, the Commission, carriers, and shippers have increased the use of carrier costs in supporting or opposing rate changes. Loss of traffic by the rails to other modes of transport and the provisions of the 1958 act

have encouraged the railroads to adjust their rates where they feel their costs and competition support the proposed adjustments (72). Selective rate cutting by the rails is being strenuously opposed by other carriers in many instances (90, 46, 49, 73). In the 86th Congress, 2d session, a bill was introduced that was designed to eliminate selective rate cutting by railroads (53, 57).

Reduced rail rates for grain often require higher carload minimum weights, single line or restricted routing, a separate charge for switching, one transit instead of three, application to one or a limited number of grains, and application only between selected origins and destinations (87). These rate reductions have disrupted traditional marketing channels that included the following: Rate equalization over various routings to broad marketing areas (29, 92); the application of a single rate to all grains and the coverage by this rate of various privileges, including circuitous routing and diversion of shipments en route; stopping, storing, mixing, and milling in transit; and the movement of grain products of lighter density on the same rate as whole grain, with favorable carload minimum weights. The historic rail rate structure, which included these features to meet the needs of the trade, was maintained for many years. Barge, truck, and Seaway competition have forced changes, and other changes will come. (82, 91).

In June 1959, railroad export grain rates to North Atlantic ports were sharply reduced. Although applying only to export grain shipped from origins on eastern railroads, these reductions affected most of the grain originating east of the Mississippi River and north of the Ohio River (ICC 4403). In effect, the eastern adjustment brought grain rates down to the level of 10 years before. Whereas former rates permitted three stops in transit, the new tariffs covered only one stop and provided for increases in minimum carload weights. Designed to lessen the impact of the St. Lawrence Seaway on the volume of export grain moving by rail to North Atlantic ports, these reductions did not change the rail rates on grain and grain products for domestic consumption (table 45). This broadened the differentials between export rail rates on grain and grain products, and the differentials between export and domestic grain rates to the East (74). It is understood that the eastern railroads are considering reductions in their domestic charges for the movement of grain and grain products from the same shipping points already treated in the export adjustment (4).

The adjustment of Eastern export rail rates had a marked influence on grain shipments to and from Chicago. Although in 1958, large volumes of grain moved from Illinois and Indiana through Chicago for export from Gulf and Atlantic Coast ports, little of the grain destined for eastern ports from Illinois and Indiana and none of the grain destined for Gulf ports was routed through Chicago in 1959 (88). From many Illinois points on the eastern railroads, export rates to the east coast fell from 50 cents per hundred pounds to 37 cents. The rate structure did not permit economical movement over the Chicago market, and the grain moved direct from country points to Atlantic ports, or was handled through transit points such as Indianapolis, Toledo, and Buffalo, or moved to the Gulf for export.

Shortly after the eastern adjustment, railroads serving the Gulf ports reduced their export rates from Illinois and Missouri origins on their lines to meet the competition, and this reduction lessened Chicago's barge receipts as well as its rail receipts (83).

Barge receipts at Chicago declined from about 65 million bushels in 1958 to 51 million in 1959. Rail receipts dropped from 143.5 million bushels to about 118 million (fig. 29). Only truck receipts increased--from about 20 million bushels to 31 million--reflecting the demand for moving grain for export by lake.

Chicago's barge shipments dropped from 12 million bushels in 1958 to less than 3 million in 1959. Rail shipments declined from 90 million bushels to 62 million. Lake shipments increased from 29 million to 49 million bushels. Overall receipts dropped more than 25 million bushels and shipments about 18 million bushels between 1958 and 1959.

TABLE 45.--Rail rates for 100 pounds of grain and grain products, excluding flour, shipped from specified cities to Baltimore, Md., for domestic use and for export, and differentials between domestic and export grain rates, and between export grain and export grain products rates, as of June 17 and 18, 1959¹

| Origin | Domestic grain and grain products (excluding flour) rates ² | Export grain rates as of-- | | Differential between domestic and export grain rates as of-- | | Export grain products (excluding flour) rates ² | Differential between export grain and grain products rates (excluding flour) as of-- | |
|--------------------|--|----------------------------|---------------|--|---------------|--|--|---------------|
| | | June 17, 1959 | June 18, 1959 | June 17, 1959 | June 18, 1959 | | June 17, 1959 | June 18, 1959 |
| | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> | <u>Cents</u> |
| Indiana: | | | | | | | | |
| Bloomington..... | 68 | 46 | 35 | 22 | 33 | 65 | 19 | 30 |
| Crawfordsville.... | 68 | 46 | 35 | 22 | 33 | 66 | 20 | 31 |
| Evansville..... | 74.5 | 50 | 37 | 24.5 | 37.5 | 74.5 | 24.5 | 37.5 |
| Ft. Wayne..... | 59.5 | 46 | 35 | 13.5 | 24.5 | 57 | 11 | 22 |
| Lafayette..... | 68 | 46 | 35 | 22 | 33 | 66 | 20 | 31 |
| Marion..... | 59.5 | 46 | 35 | 13.5 | 24.5 | 57 | 11 | 22 |
| Michigan City.... | 68 | 46 | 35 | 22 | 33 | 66 | 20 | 31 |
| Muncie..... | 59.5 | 46 | 35 | 13.5 | 24.5 | 57 | 11 | 22 |
| South Bend..... | 66.5 | 46 | 35 | 20.5 | 31.5 | 62.5 | 16.5 | 27.5 |
| Terre Haute..... | 72.5 | 48.5 | 37 | 24 | 35.5 | 69 | 20.5 | 32 |
| Michigan: | | | | | | | | |
| Adrian..... | 55 | 46 | 35 | 9 | 20 | 54 | 8 | 19 |
| Jackson..... | 59.5 | 46 | 35 | 13.5 | 24.5 | 57 | 11 | 22 |
| Kalamazoo..... | 66.5 | 46 | 35 | 20.5 | 31.5 | 62.5 | 16.5 | 27.5 |
| Lansing..... | 66.5 | 46 | 35 | 20.5 | 31.5 | 62.5 | 16.5 | 27.5 |
| Niles..... | 66.5 | 46 | 35 | 20.5 | 31.5 | 62.5 | 16.5 | 27.5 |
| Ohio: | | | | | | | | |
| Akron..... | 50.5 | 46 | 32 | 4.5 | 18.5 | 48 | 2 | 16 |
| Cincinnati..... | 55 | 46 | 35 | 9 | 20 | 54 | 8 | 19 |
| Cleveland..... | 50.5 | 46 | 32 | 4.5 | 18.5 | 48 | 2 | 16 |
| Dayton..... | 55 | 46 | 32 | 9 | 23 | 54 | 8 | 22 |
| Lancaster..... | 52 | 46 | 32 | 6 | 20 | 48.5 | 2.5 | 16.5 |
| Lima..... | 52 | 46 | 32 | 6 | 20 | 48.5 | 2.5 | 16.5 |
| Mansfield..... | 50.5 | 46 | 32 | 4.5 | 18.5 | 48 | 2 | 16 |
| Marion..... | 52 | 46 | 32 | 6 | 20 | 48.5 | 2.5 | 16.5 |
| Tiffin..... | 52 | 46 | 32 | 6 | 20 | 48.5 | 2.5 | 16.5 |
| Zanesville..... | 50.5 | 46 | 32 | 4.5 | 18.5 | 48 | 2 | 16 |

¹ Soybeans are not included. Rates indicated are corn rates.

² No change in rates, June 17, 1959, to June 18, 1959.

Bd. of Trade, Chicago, Ill. (See footnote 1, table 26.)

Effective March 10, 1960, eastern railroads reduced export rates on corn, oats, and soybeans from some Illinois and Indiana country shipping points with the provision that no higher rates would apply through Chicago to the east than applied from these points by other routings. The average reduction was around 6.5 cents per hundred pounds. On January 1, 1960, barge grain rates were reduced from Cairo, Ill., Burlington, Iowa, and Cape Girardeau, Mo., to Chicago.

Another rate development that may have a significant effect on the volume of export grain handled at Chicago, as well as at other ports, was the publication, effective March 7, 1960 (ICC 11389), of proportional export rates from Missouri River markets to ports on Lakes Michigan and Superior.⁴ These rates are 5 to 6 cents per hundred pounds under former applicable rates. Their publication followed reductions in rates for coarse grain from interior points in Iowa, Minnesota, and South Dakota to the same markets. As a result, rail rates covering movements of corn, oats, and soybeans to Duluth-Superior are lower than rates to Chicago from shipping points in Minnesota and in northern Iowa (north of a line drawn through Aredale, Luverne, Laurens, Alton, and Merrill, Iowa), and are equalized to these lake ports from a triangular area extending from Omaha, Nebr., north through Sioux City and McNally, Iowa, east to Lake City, Iowa, and south through Harlan, Iowa, to Omaha. Generally, rail rates to Chicago are lower from other Iowa origins. Effective August 20, 1960, export rail rates were reduced on corn, oats, and soybeans from selected eastern Nebraska points to lake ports.

⁴ Western Trunk Line Committee Application X-E-21-5334. [Proposal of Chicago and North Western Railway to publish export rates on whole grains from Missouri River crossings and interior points in Iowa, Missouri, and Minnesota to Lake Michigan and Lake Superior ports. WTL Application 21-5334, Appendix E]. June 8, 1959.

In effect, grain moving to Chicago on these exports rates can move overseas either by the Great Lakes-Seaway route or by rail to Atlantic Coast ports for loading on overseas vessels. These reduced export rates from Missouri River origins may attract export grain principally for movement beyond the lake ports by water since combination rail-ocean charges via Atlantic ports to overseas destinations exceed direct water transportation charges from ports on the Great Lakes (see page 108).

Principally to meet truck competition, railroads serving the lake ports of Duluth-Superior and the river ports of Minneapolis-St. Paul-Savage, on the Mississippi River, reduced their local grain rates in 1960 from selected origins in Minnesota, South Dakota, and North Dakota, (ICC Docket No. 33408). The reductions range from 8.5 to 13.5 cents per hundred pounds. The rate reductions on corn, oats, barley, and soybeans permit one transit stop and provide for application of the comparatively low proportional or re-shipping rates beyond the markets.

Reduced rates on wheat, rye, and flaxseed are in effect but under investigation by the Interstate Commerce Commission. These rates do not carry this privilege unless the shipper pays the difference between the lower and the higher inbound rail rates. The rate changes on these commodities will assist the rails to meet truck competition to Minneapolis and Duluth, but effectively limit movement beyond the markets to either truck or water transportation (90). Rail lines with trackage east of the Minneapolis market are trying, through proposed rate changes, to overcome the loss of traffic on their lines resulting from these nontransit rates to the market.

Late in 1958, local rail grain rates into the Toledo market from origins in Michigan, Indiana, and Ohio were reduced to meet truck competition. Truck receipts at this market increased from 16 million bushels in 1958 to 22 million in 1959, while rail receipts increased from 70 million to about 85 million bushels (fig. 29). The 1959 adjustment in eastern rail export rates included Toledo as a transit point and this probably was instrumental in increasing rail receipts. Rail shipments in 1959 were about 10 million bushels greater than in 1958. Lake shipments increased 6 million bushels, about the same as the increase in grain received by truck.

Early in November 1959, southern railroads serving the Southeastern States published reduced rail grain rates based on a mileage scale. Unlike the 1959 rate reduction in the same territory, referred to on page 67, these reduced rates, when added to rates from grain origins in the West, do not permit coarse grains to move through any one of several markets to southern destinations at equalized rates.

The relatively small feed-processing plant, typical in the Southeast, carries minimum grain inventories and must have regularly scheduled deliveries. Much of the feed now moves in bulk by truck from southeastern feed processors to customers. There is no longer the necessity of moving feed ingredients in by railroad to satisfy transit arrangements at the processing point (25, 27, 29). The southeastern processor of feed and flour brings grain in by the cheapest mode of transport, thus much of this grain moves by barge and truck. Midwestern feed and flour processors, who shipped their products in bags for many years, began to ship flour and feed in bulk by rail in the late 1950's using covered hopper cars. Extensive use of these cars may increase rail movements of grain products and possibly check the growth of grain movements into the Southeast by barge and truck. However, barges have been constructed for moving feed and flour in bulk. Movement by such barges into the Southeast for overland transportation from Tennessee River ports may pose an additional competitive factor for the railroads (30, 40).

In June 1960, the all-rail rate on corn from Indianapolis to Gainesville, Ga., near Atlanta, was 70.5 cents per hundred pounds, or 39.5 cents per bushel. The truck charge for this movement as of October 1, 1958, was about 28 cents per bushel (17). From Indianapolis to Rocky Mount, N. C., the June 1960 rail rate for corn was 77.0 cents per hundred pounds or 43.1 cents per bushel. On October 1, 1958, the truck charge was about 34 cents per bushel. Both Gainesville and Rocky Mount are centers of heavy broiler production. It appears that the southern lines' grain rate reduction will not increase rail tonnage

appreciably, since combination truck-barge charges, in many cases, are still lower than direct trucking charges (table 29). Effective January 1, 1960, barge rates were also reduced from Cairo and Metropolis, Ill., to Guntersville, Ala.

In January 1960, the U.S. Supreme Court affirmed a northern Alabama district court's decision outlawing any railroad rate-making device that deprives shippers of any of the savings of barge transportation (361 US 353) (47, 73). This reversed the ICC decision in Docket No. 30744, popularly known as the Tennessee Case. Under the now outlawed rate-making device, the grain inbound by rail to transfer points, such as Guntersville, moved outbound on rail transit balances, which were lower than the flat rail rates that applied when the grain arrived at the transfer points by barge. In past cases (330 U.S. 567 and 351 U.S. 56), the Supreme Court ruled railroads must charge barge traffic the same rates as rail traffic at transfer points where the outgoing rates are published as a separate item, a so-called proportional or reshipping rate. The Tennessee Case was the first to test the same principle where the railroads operate on a joint through rate, rather than a proportional rate. It is expected the Supreme Court's decision will have widespread impact in all areas where barge lines compete with railroads and may hasten rail-barge cooperation by publication of joint rail-barge rates applicable to through routes.

The Interstate Commerce Commission has reopened the hearings to receive further evidence on the divisions of through rates received by the railroads on ex-rail (rail inbound and outbound) traffic not only from ports named in the decision, but from other ports similarly situated, and evidence relevant to whether, and to what extent, such divisions should determine the rail rates from such ports on ex-barge (barge inbound, rail outbound) traffic (54).

Another important grain rate adjustment is that embodied in ICC Docket No. 31874. In this complaint, instituted in 1955, the governors of the Southern States attacked the level of rates applying to grain and grain products shipped to, from, and within the South. The record in this complaint was completed late in 1959 and it probably will be some time before a final decision is reached. In the meantime, as noted above, southern railroads have reduced their rates on coarse grain and grain products within the Southeast to meet truck and barge competition.

In November 1958 and early 1959, railroad rates on coarse grain and soybeans from the Tennessee River ports were reduced to meet truck competition.

Southwestern railroads, serving the Gulf ports, also are faced with competition from other carriers. Much grain moving through Missouri River markets is destined for Gulf ports, and large volumes move out of the North Central Region to southwestern feeders, as noted on page 58.

The reduced export rail rates made effective in 1960 to lake ports from Missouri River origins could reduce the grain volume handled by the southwestern lines. Increased barge traffic on the Missouri River also could reduce rail volume.

Export rates on coarse grains from Kansas City and other Missouri River markets to the Gulf ports were reduced in August and September 1960 (77). The railroads published new proportional rates of 32 cents per hundred pounds from Kansas City and 35.5 cents from Omaha. These rates do not permit storage or milling-in-transit. As of April 1, 1960, the proportional rail rate on coarse grains from Kansas City to Gulf ports was 41 cents, and the barge rate was 23.75 cents per hundred pounds. Rail rate reductions of about 20 cents per hundred pounds, from 62 to 42.5 cents, were made on a domestic basis.

Early in 1960, some southwestern rail lines reduced the flat, or local, rates on coarse grains applying from Kansas City to southwestern destinations for grain originating in southern Kansas, northern Oklahoma, and Iowa. Before these reductions the through rates from the same origins to southwestern destinations had been reduced below the level of the combination of applicable inbound and outbound rates through Kansas City, and the grain by-passed the Kansas City market. The 1960 reductions beyond Kansas City

equalize the combination inbound-outbound charges through Kansas City and the through charges from the country origins to southwestern destinations. These rail rate reductions also serve to meet increasing truck competition from the country points direct to southwestern destinations.

To meet the competition of merchant truckers hauling coarse grains westward from Nebraska and Kansas to Colorado, Wyoming, and western Nebraska, the railroads have proposed rate reductions from the Missouri River market area. They have proposed lower proportional rates with transit privileges from the markets and lower local rates with one transit (that is, one stopover) from points in the Missouri River Valley other than the markets.

Western railroads were considering reduced export rates on wheat from Nebraska, Kansas, Colorado, Wyoming, and Utah to the West Coast ports in October 1960, (TCFB Appln. No. B-8880). The proposed reduction was about 18 cents per hundred pounds and carried storage-in-transit privileges. It represented an effort by producers to make hard red wheat competitive with other wheats in Far East markets (8, 61). Adoption of the proposal apparently would not greatly affect export volume moving through the Gulf ports to the Orient and other markets.

Kansas City and other interests are seeking relief from the rail rate break rule over specified markets, ICC Docket No. 33338 (48, 68, 92). For example, under existing tariffs, grain moving by rail from Nebraska origins into Omaha moves on to Chicago on a charge that includes the local rate into Omaha plus the proportional to Chicago. Certain grain interests are seeking the privilege of moving this grain from Omaha to Kansas City for transit and then to Chicago on a balance-out rate basis; that is, the proportional rate from Omaha to Chicago less the rate paid from Omaha to Kansas City. In effect, this would be a shrinkage proportional rate similar to that applying in 1960 from St. Louis to Memphis on grain movements from Kansas City. The direct proportional rail rate from Kansas City to Memphis was 39 cents (January 1, 1960). The combination of proportionals from Kansas City through St. Louis to Memphis totaled 48.5 cents; but the shrinkage proportional rate applicable from St. Louis to Memphis was 14 cents, and when added to the 35-cent rate from Kansas City to St. Louis it balances with the direct proportional, Kansas City to Memphis, of 39 cents.

The proportional rate from Omaha to Kansas City in 1960 was 14 cents, and from either Kansas City or Omaha to Chicago the domestic proportional rate was 32.5 cents. Under the proposal, the 14-cent rate would be deducted from the 32.5-cent proportional from the Missouri River markets to Chicago, permitting transit at Kansas City. Several markets other than Chicago were included in this proposed rate adjustment. Initial hearings were held in June 1960. Should the proposal become effective, it would restore a situation found unlawful by the ICC in Grain Case Modifications, 231 ICC 793, a decision upheld by the Supreme Court in 1942 in Board of Trade of Kansas City, Mo., v., U.S., 314 U.S. 534 (68).

The railroads proposed another general increase (Ex Parte 223) in rail rates late in 1960. Rates on grain would be increased one-half cent per 100 pounds where existing rates were 65 cents or less, and rates higher than 65 cents would be increased 1 cent per 100 pounds.

Innovations in rates such as publication of multiple car or trainload rates have been approved by the Interstate Commerce Commission for some commodities (41, 59, 76). Agreed charges--that is, the lower rates a railroad agrees to charge a shipper in return for his moving a guaranteed percentage of his total traffic by rail--were in effect in 1960 for some commodities (50, 75) but were under investigation by the Interstate Commerce Commission (60). Some of these rate innovations may be sought for grain movement.

Large shippers are increasingly resorting to their own trucks and barges for movement of their freight. This is very important in the movement of grain and grain products

on the highways and the waterways. The efforts of the railroads to purchase bargelines (3, 62, 69, 20, 21) and to substitute truck for rail service (9) reflect their stated desire to provide coordinated transportation service. Bargelines and truckers are opposing many of the rail proposals.

Various groups are proposing removal of the bulk exemption clause applicable to barge transportation and the agricultural exemption clause applicable to truck transportation of unprocessed agricultural commodities (page 34) (51, 52, 56). The possible imposition of user charges on the inland waterways (55) and higher taxes on truckers for use of highways also have support in some quarters. Should these efforts be successful they will reduce competition and may tend to restore patterns of grain movement that prevailed at the end of World War II. A probable result would be higher freight rates for the movement of grain.

What has been described might be called a revolution in grain transportation. An industry that in past years saw relatively minor changes is now in the throes of constant change. The railroads' position as the primary hauler of grain has been challenged, and future developments are hard to foretell (91).

Potential of the Great Lakes-St. Lawrence Seaway

In early 1961, what were the Seaway's prospects for the year in terms of grain tonnage (14, 16, 83)? The principal determinants appeared to be the physical facilities available for transferring the grain from port elevators to vessels and the level of charges, both overland to lake ports and from the ports to overseas destinations.

The deepening of connecting channels between the upper lakes, under way in early 1961, was not expected to be completed until 1962. The Corps of Engineers, U. S. Army, was studying the physical and economic feasibility of deepening harbors at ports on the Great Lakes and so far, had recommended that numerous harbors be deepened to 27 feet. Winter dredging had been done at a few marine loading facilities and new elevators were under construction where deeper water was available. The extensive harbor dredging program recommended by the Corps of Engineers was expected to take several years and was dependent on congressional approval and appropriations. Harbor and channel depths were about the same in 1961 as they were in 1960.

The loading spouts of some elevators were being raised and increased in number to permit faster loading of grain into ocean vessels. Together with dredging at some elevators, this permits heavier and faster loading. It should result in more grain shipments in larger vessels, including greater use of lake vessels. With expanded facilities at Montreal and other Canadian ports and a new export elevator available at Baie Comeau, Quebec (13), on the lower St. Lawrence River, the lake vessels were expected to move grain to these ports and return with ore cargo to ports on Lake Erie. Any increase in grain-ore shuttle movement in lake vessels was expected to be confined principally to and from Lake Erie ports, and not to affect significantly the direct overseas shipments in oceangoing vessels from ports on Lakes Michigan and Superior. In 1959, some 30 percent of the lake vessels passing through the Seaway in each direction were in ballast (31). If this grain-ore shuttle service develops, it may bring lower export charges and increase transshipment of grain in oceangoing vessels from St. Lawrence ports.

In 1959, all direct overseas shipments of U. S. grain from lake ports moved in foreign vessels. Foreign shipping concerns indicated they were making substantial investments in new vessels specifically designed for use from lake ports to overseas areas. The greater use of large oceangoing vessels to and from ports on the upper lakes, replacing the smaller vessels used extensively in 1959-60, is a distinct possibility if world shipping capacity continues to substantially exceed cargoes available. Ship charters for grain movement in 1961 indicate that rates will be about the same as they were in 1959 (83) and 1960.

In early 1961, the eastern railroads' 1959 rate reduction for export grain was expected to affect Seaway grain shipments less as anticipated improvements in grain transfer facilities, harbors, and channels on the Lakes-Seaway route became available. Barge transportation of grain to the Gulf for export offered the greatest competition with the Seaway route.

Rail competition for hauling grain to the various port areas lowered export rates, to the benefit of shippers using the Seaway as well as those using other export outlets. In 1960, on direct corn shipments from ports on the upper lakes to northern Europe, transport savings were about 6 cents per bushel compared with movement from the Gulf ports, and 13 cents compared with routing through Buffalo and North Atlantic ports. On shipments from Lake Erie ports by the Seaway the transportation advantage over the North Atlantic was about 10 cents a bushel (82). General efficiencies resulting from past experience with Seaway grain shipments, the improvements being made to channels, harbors, and transfer facilities, and the changed overland rates to the lake ports resulted in an increase in U. S. overseas grain exports through the Seaway in 1960, and a further increase was expected in 1961 if overall exports increased over 1960.

Grain traffic data at lake ports in 1959 and 1960 indicate the upward trend in export movement of grain from U.S. ports on the Great Lakes (table 46). Total export shipments to Canada and overseas were up about 16 million bushels, or 12 percent, from 1959. Table 47 shows that the railroads moved more export grain to North Atlantic and Great Lakes ports in 1960 than they did in 1959. Rail carloads of export grain to North Atlantic ports were up about 21 percent and to lake ports about 11 percent. In the fall of 1960 the U.S. Department of Agriculture relocated some 25 million bushels of wheat from the Midwest to the East, doubling the storage of grain in the maritime fleet. This increased substantially the rail carlot shipments of wheat to Atlantic ports. On the basis of grain inspections at U.S. ports, total 1960 exports were 112 million bushels (over 11 percent) greater than 1959 exports (table 48).

TABLE 46.--Estimated grain exports from selected ports on the Great Lakes, 1959 and 1960

| Port | 1959 | 1960 |
|---------------------------------------|------------------|------------------|
| | <u>1,000 bu.</u> | <u>1,000 bu.</u> |
| Chicago..... | 32,129 | 33,255 |
| Duluth-Superior..... | 86,389 | 92,924 |
| Toledo..... | 12,471 | 19,374 |
| Milwaukee ¹ | -- | 1,220 |
| Saginaw-Carrollton ¹ | 3,398 | 3,248 |
| Total..... | 134,387 | 150,021 |

¹ Data obtained from Grain Market News (63).

Boards of trade, except as noted.

TABLE 47.--Rail carloads of grain unloaded for export at North Atlantic and Great Lakes ports, by months, 1959 and 1960

| Month | North Atlantic ports | | Great Lakes ports | |
|----------------|----------------------|-----------------|-------------------|-----------------|
| | 1959 | 1960 | 1959 | 1960 |
| | <u>Carloads</u> | <u>Carloads</u> | <u>Carloads</u> | <u>Carloads</u> |
| January..... | 5,984 | 6,524 | -- | -- |
| February..... | 6,020 | 6,509 | -- | -- |
| March..... | 6,860 | 6,553 | -- | -- |
| April..... | 3,769 | 6,838 | 358 | 1,061 |
| May..... | 3,881 | 2,819 | 6,764 | 7,491 |
| June..... | 3,974 | 2,026 | 11,536 | 9,725 |
| July..... | 6,161 | 5,462 | 9,949 | 5,996 |
| August..... | 6,166 | 9,337 | 7,076 | 7,968 |
| September..... | 3,730 | 5,439 | 3,356 | 10,144 |
| October..... | 4,700 | 9,850 | 6,597 | 8,122 |
| November..... | 11,924 | 13,245 | 6,255 | 6,842 |
| December..... | 9,217 | 13,036 | 643 | 928 |
| Total..... | 72,386 | 87,638 | 52,534 | 58,277 |

Association of American Railroads, PT Reports.

TABLE 48.--Inspections of grain for export from United States ports, by months, 1959 and 1960¹

| Month | 1959 | 1960 |
|----------------|------------------|------------------|
| | <u>1,000 bu.</u> | <u>1,000 bu.</u> |
| January..... | 79,508 | 66,262 |
| February..... | 69,583 | 81,139 |
| March..... | 72,057 | 91,039 |
| April..... | 77,705 | 84,151 |
| May..... | 79,366 | 90,551 |
| June..... | 96,755 | 107,397 |
| July..... | 81,347 | 71,601 |
| August..... | 80,744 | 92,500 |
| September..... | 82,879 | 89,268 |
| October..... | 62,071 | 84,649 |
| November..... | 88,626 | 134,033 |
| December..... | 101,969 | 91,838 |
| Total..... | 972,610 | 1,084,428 |

¹ Grains include wheat, oats, barley, rye, flaxseed, corn, soybeans, and sorghums for grain.

NOTE: Overseas movement of United States grain from Canadian elevators on the St. Lawrence River in 1960 totaled 26.3 million bushels.

Grain Market News (63).

The Future of Barge and Motortruck Movement

Barring any substantial changes in legislative or governmental policy, the railroads will have increasing competition from barges on the inland waterways and from trucks on the highways during the 1960's. Our commercially navigable waterways are being improved and expanded (45), as evidenced by the Missouri River improvements and the channeling of the Arkansas River (82, 33). Sioux City may develop into a major grainport since it will be at the head of navigation on the Missouri, some 760 miles from the Mississippi River. Nine-foot navigable channels are scheduled to be available from Catoosa, Okla., on the Arkansas River near Tulsa, for some 440 miles to the Mississippi River in 1967, providing a direct all-water route to New Orleans-Baton Rouge and other ports on the Gulf and the inland waterways.

Many other potential inland waterway improvements were under consideration in 1960, including the Trinity River in Texas (82). Should this river be developed for barge navigation, Fort Worth and Dallas would become important grain shipping ports. Deep-draft navigation to accommodate large ocean vessels far up the Columbia River also was still being considered in early 1961. Another interior to Gulf outlet, the navigable connection of the Tennessee-Warrior Rivers in Mississippi and Alabama leading to Mobile also was under consideration.

The extensive program of highway improvements, coupled with the use of multitrailer truckloads on throughways, will tend to reduce trucking costs. These improvements probably will have far-reaching effects on our major grain markets (83).

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Growth Through Agricultural Progress

